

# Explorative study on performance measurement systems' usage practices and outcomes

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**Abstract**

**Objective of the study:** This study explores how performance measurement systems are used in practice, and how satisfied users are with their systems. Further, the study focuses on assessing benefits and challenges that users of performance measurement systems are experiencing, as well as identifies specific usage practices that influence the experienced benefits and challenges. The context of the study is QPR Software's customer base.

**Research method:** The research project was conducted in two phases; first a survey was prepared and sent to contacts in QPR Software's customer relationship management (CRM) database. The objective of the survey was to explore how sophisticated and strategic usage practices the users have, what are the systems mainly used for, and how satisfied they are with their systems. The survey also categorized the respondents' according to their usage practices. In the second phase, a multiple case study was conducted with selected respondents from the most represented usage category found in the survey. In total, seven interviews were conducted with interviewees from five different organizations. The multiple case study's objective was to further increase understanding on what the systems are used for, what sort of benefits and challenges the users are experiencing, as well as recognize usage practices affecting the benefits and challenges.

**Findings of the study:** Majority of the respondents were found to belong to a category where the usage practices were seen as operational; they combined both financial and non-financial measurements, but hadn't separated the measurements into a specific framework for strategic performance measurement. Among the cases, the systems were used for a variety of purposes when assessed in organizational context. However, although the usage practices among the category were not seen to reflect strategic usage, in most cases, the systems were also used for developing and implementing strategy. The main benefits of PM were found to be related to supporting in decision-making and control, enabling and increasing communication and transparency, and promoting learning. Particularly, appropriate balance between interactive and diagnostic use of controls, the use of cause-and-effect relationships, standardized measurements, standardized terminology, and benchmarking, were found to be usage practices contributing to the benefits. It was however found in the interviews, that the organizations' context was seen to affect the way in which specific usage practices contributed to the benefits and challenges experienced among the case organizations. Common main challenges with performance measurement among the case organizations were for the most parts, related to ambiguity of performance measurement objectives, and data quality.

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**Keywords** performance measurement, performance measurement systems, usage practices, measurement outcomes

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## Tiivistelmä

**Tutkimuksen tavoite:** Tämän tutkimuksen tavoitteena on tarkastella miten suoritusmittausjärjestelmiä käytännössä käytetään, kuinka tyytyväisiä järjestelmien käyttäjät ovat, sekä millaisia hyötyjä ja haasteita käyttäjät kokevat. Tutkimuksen kontekstina on QPR Software -yrityksen asiakastietokanta. Työn tarkoituksena oli keskittyä erityisesti suoritusmittausjärjestelmien erilaisiin käyttötapoihin, sekä siihen, kuinka nämä vaikuttavat käyttäjien kokemuksiin järjestelmistä.

**Tutkimusmenetelmä:** Tutkimus toteutettiin kaksivaiheisesti. Ensin valmisteltiin kyselytutkimus, joka lähetettiin QPR Software:n asiakastietokannassa oleville kontakteille. Kyselyn tavoitteena oli selvittää, miten kehittyneitä ja strategisia käyttötapoja vastaajilla on, mihin järjestelmiä käytetään, ja kuinka tyytyväisiä käyttäjät järjestelmiinsä ovat. Kyselyn avulla myös kategorisoitiin vastaajia käyttötapojen mukaan. Toisessa vaiheessa valittiin vastaajien joukosta seitsemän haastateltavaa viidestä eri organisaationsta. Haastateltavat valittiin lukumäärältään suurimmasta kategoriasta. Haastattelujen avulla selvitettiin tarkemmin, mihin mittausjärjestelmiä käytetään, kuinka vastaajat ovat hyötynneet järjestelmistä, ja millaisia haasteita he kokevat.

**Tutkimustulokset:** Suurin osa kyselyyn vastanneista kuului ryhmään, jossa käyttötavat olivat operatiivisia; he yhdistivät sekä taloudellisia että ei-taloudellisia mittareita, mutta eivät olleet erottaneet mittausjärjestelmänsä strategiseksi. Case -organisaatioiden joukossa järjestelmiä käytettiin kontekstista riippuen moniin eri tarkoituksiin, mutta vaikka käyttötapojen valossa järjestelmien käyttö ei ollut strategista, useimmissa tapauksissa järjestelmää käytettiin myös strategian mittaamiseen ja implementointiin. Keskeisimmät suoritusmittaamisen hyödyt haastateltavien joukossa olivat: tukeminen päätöksenteossa ja kontrolloinnissa, kommunikaation parantuminen ja läpinäkyvyyden lisääntyminen, sekä oppiminen. Erityisinä, hyötyjen kannalta edullisina käyttötapoina erottuivat tasapaino diagnostisen ja interaktiivisen käytön välillä, syy-seuraus-suhteiden hyödyntäminen mittareiden välillä, yhdenmukaiset mittarit eri yksiköiden välillä, ja vertailuanalyysien tekeminen. Haastattelut osoittivat kuitenkin, että käyttötapojen kontribuutio hyötyjen saavuttamiseen vaihteli organisaation kontekstista riippuen. Haasteellisimpina asioina koettiin yleisesti mittaamisen tavoitteiden monitulkintaisuus, ja käytettävän datan laadukkuus.

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**Avainsanat** suoritusmittaus, suoritusmittausjärjestelmät, käyttötavat, mittaamisen hyödyt

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# **1. INTRODUCTION**

Performance measurement and management has gone through significant changes over the past 30 years as traditional accounting based measurements have largely been complemented or replaced by non-financial key performance indicators (KPIs), and strategic performance measurement systems (SPMSs), such as the Balanced Scorecard (Kaplan & Norton, 1992). These systems have been well promoted and they have become increasingly common among organizations. Throughout the period, a significant amount of research has been conducted on performance measurement systems, focusing on the technical aspects of how to design a performance measurement system, and on studying the implementation process of such systems. More recently, the research has focused on investigating the impacts of PM system implementation on business performance.

In many cases, research has concluded that implementing performance measurement systems has positive organizational effects and that it can improve company results in the long term (Malina & Selto, 2001; Speckbacher et al., 2003). Some of the promoted positive effects increasing company performance have been that performance measurement systems make decision-making more efficient and informed (Chenhall & Langfield-Smith, 2007), and provide a clearer, more holistic view of the organization's status (Kaplan and Norton, 1992). Moreover, with appropriate performance measurement, research has suggested that the systems can benefit organizations by driving organizational strategy, supporting planning and decision-making, acting as an effective tool for communication, fostering organizational learning and by communicating achieved results to stakeholders (Micheli & Manzoni, 2010).

However, research on impacts of performance measurement are inconsistent in their findings, as empirical research also finds numerous cases where positive impacts have not realized for organizations implementing PM systems, and have reported potential problems and challenges. Full implementation of SPMSs can be challenging since several controllable or uncontrollable factors may act as barriers (Kasurinen, 2002), different stakeholder groups may have goals that conflict with organizational strategy, and mapping causal chains between strategic objectives, processes, and KPIs can in practice be very challenging (Otley, 1999; Norreklit, 2000).

A key determinant for assessing the successfulness of performance measurement system implementation and usage is also the purpose for which it is used, and defining objectives and purposes for the PM system can be challenging. Researchers have suggested that the purposes of the entire system should be explicitly defined, and decide whether the systems are strategic or solely operational (Micheli & Manzoni, 2010; Ittner et al., 2001). In case of SPMSs, the systems primary purpose should be to drive strategy, and the starting point for the design of the PM system should be the vision and strategy of the organization (Kaplan & Norton, 1993). However, in practice, even the objectives behind the strategy can be unclear. Also, the use of diagnostic and operational performance systems can be ambiguous and challenging, if its role in relation to strategy is not explicitly defined (Micheli & Manzoni, 2010).

In response to the inconsistency of findings related to impacts of implementing performance measurement systems, the emerging field has recognized that it might be more relevant to investigate how performance measurement systems are used as opposed to whether they are used (Tuomela, 2005; Bourne, 2014). It has been identified that there is rather little academic research on how performance measurement systems are actually used (Hoque, 2014). Moreover, the practical relevance of the lack of research, has led to the concern that if organizations are to realize value in the longer term, research should increase understanding on how appropriate performance measurement practices deliver positive organizational effects and improved performance (Micheli & Manzoni, 2010; Hoque, 2014).

## **1.1. Research objective**

This explorative study attempts to add to the knowledge on how performance measurement (PM) systems are used in practice. More specifically, the aim is to study organizations' practices in performance measurement system usage, usage purposes, and benefits and challenges that users of performance measurement systems have. The context of the study is QPR Software's potential, past and current customers, reached from the company's customer relationship management (CRM) database. QPR Software provides software –based solutions for strategy execution, performance and process management, process mining, and enterprise architecture. The company

was founded in 1991 and they're headquarters are located in Helsinki, Finland. They have over 20 years of experience from strategy execution, performance management and business process analysis. QPR Software's products are widely spread as the company has sold over one million licenses, they have over 1500 customers globally, and a network of 68 partners in over 50 countries.

The research deploys an explorative survey to categorize users of PM systems into categories that should reflect how sophisticated, and how strategic the usage practices are. The categorization used in this study consists of five categories; financial measurement, operational measurement, strategic I, strategic II, and strategic III. Based on the survey, the study also provides explorative evidence on the usage purposes and satisfaction with performance measurement system among different usage categories. After this, a multiple case study is devised with selected survey respondents to further increase understanding of the objectives, benefits and challenges that users in the most represented usage category found in the survey, i.e. the 'operational' category, are experiencing, and why.

## **1.2. Structure of the thesis**

The study is structured as follows. First, the literature review provides theoretical background from previous literature for analyzing PM systems' usage practices, and presents the analytical framework for categorizing usage of performance measurement systems. The literature review then categorizes current literature on common benefits and identifies challenges that organizations experience with their PM systems, focusing on decision-making and planning, communication and transparency, learning, and gaining legitimacy. The methodology part discusses methodological choices of the study, and introduces the two methods used to gather empirical data; a survey sent to QPR Software's CRM database, and a multiple case study conducted with selected survey respondents. After the methodology chapter, the findings are presented by first focusing on findings made with in the survey, after which the cases in the multiple case study are presented and analyzed. Finally, the discussion and conclusions chapter summarizes the research, summarizes the main findings of the study, and provides theoretical and practical implications.



## **2. LITERATURE REVIEW**

This section of the study presents the theoretical background for the analysis. The first part of the literature review focuses on discussing usage practices of PM systems in light of their usage purposes, and develops a framework for categorizing users based on the sophistication of their usage practices, and level of strategy implementation. The second part of the literature review is focused on benefits and challenges that organizations have with their PM systems, particularly focusing on topics that relate to the usage of the system. The objective is to recognize usage related topics that should enable firms to benefit the most from their' PM systems and to recognize what factors might lead to the benefits not realizing.

### **2.1. Usage of performance measurement systems**

When studying the usage of performance measurement systems, the use of the systems can be categorized and analyzed from various perspectives. For example, the usage of a performance measurement system defines whether it is a decision-support system or a control system (Malmi & Brown, 2008), which suggests that performance measurement could be analyzed based on whether they are mostly used for guiding decision-making or mostly for control purposes. Performance measurement systems have also been studied by focusing on the context in which they are used (contingence), and research in this vein suggest that the benefits from PM system usage have to do with organizational fit (Chenhall, 2003), offering a point-of-view to study the usage based on contextual factors of the organization and how well the system fits with the organization's environment.

Another viable way to analyze use of a system could be to categorize usage based on whether they are used interactively or diagnostically (Simons, 2005). Diagnostic and interactive use of controls are part of Simons' framework of strategic control, in which the control is determined by the way the system is used. The framework also includes beliefs systems, and boundary systems. In the framework, it is suggested that belief systems are used to enhance core values related to strategy, and boundary systems set limits to undesirable actions. Diagnostic control refers to using the

system to control that critical success factors are monitored and communicated, and finally, interactive use of controls refers to discussions on critical success factors and learning about the strategy and environment. In the traditional sense, practical performance measurement can be seen to link mostly with diagnostic control, since it includes the monitoring of performance, decision-making, and communication. Although in Simons' framework, communication is included under diagnostic control, it is more geared towards reporting information without questioning or analyzing uncertainties related to the measurements. In contrast, communication in interactive use of controls can be seen as usage, that enables learning by promoting and provoking discussion (Tuomela, 2005).

For the purposes of this study, the distinction between diagnostic use of controls and interactive uses of controls can have relevance. It is suggested that a performance measurement system can be used for both diagnostic control and interactive control. A diagnostic set of measurements can be used to analyze organizational performance on chosen performance measures at one point in time and then modified, questioned, and developed as a result of interactive control in another point in time. Balance between the two control levers has relevant consequences on the PM systems role and ability to create learning and flexibility (Micheli & Manzoni, 2010; Tuomela, 2005).

Another way to categorize and structure the use of PM systems is to analyze the purposes for which they are designed and used. It is claimed that organizations often have difficulties in defining a primary usage purpose for their PM system (Tuomela, 2005), which perhaps can partly be explained by the different roles and usage purposes that PM systems may have in organizations. Micheli and Manzoni (2010) draw from the literature and describe that research has considered PM systems as means to: implement and reformulate strategy, communicate key objectives, provide strategic alignment, support process improvement, encourage innovation, and promoting specific behaviors on different organizational levels. The implication being that PM systems can indeed have many roles in organizations which can lead to difficulty in defining primary usage purposes for the systems. They conclude that, "This plurality of roles is not necessarily positive or negative, but rather emphasizes how different SPMSs fulfil different needs and how there is no 'one-size-fits-all' measurement system." (Micheli & Manzoni, 2010, p.470). Building on top of

the findings presented above, the literature review will focus on categorizing usage based on usage purposes. This is done to identify the importance of alignment between intended and actual usage purposes, and to understand how appropriate performance measurement practices can deliver improved performance.

## **2.2. Purposes for performance measurement**

In order to study the outcomes, such as satisfaction, benefits, and challenges, the purposes for which the PM system has been designed for and is used for, is an important determinant. This focus and choice of specific usage purposes has been called for in management accounting research, while also acknowledging that in practice the purpose is rarely explicit. Micheli and Manzoni (2010) find that a clear definition of purposes for PM, benefits organizations, and call for scholars and organizations to have clear definitions, in research and practice, of the purpose for PM systems. They highlight that this distinction is especially important when it comes to determining the role of the PM system in strategic reviews and prescribe that, “Organizations should explicitly decide whether their measurement system is strategic or solely operational. This choice is likely to determine the link between strategy and performance measurement, and the relevance of the PM system within the organization.” (Micheli & Manzoni, 2010, p. 473). Also, Ittner and Larcker (2001) recognize that studies do not sufficiently take into account the use of performance measures for different purposes, when investigating performance measurement benefits. In empirical research it has also been highlighted that contradictory views of the objectives of the PM system can be unclear and even lead to PM system causing negative effects for the organization implementing it (Kasurinen, 2002).

Historical dimension of management accounting research and practice provides theoretical background for determining different purposes for which management accounting, and management control systems, have been used for. Before the 1950s, management accounting was mostly focused on financial planning and control through the use of budgets and traditional cost accounting. After this, it was found that traditional management accounting performance measures

were considered unsatisfactory, and how operations management could provide directions for improvements, thus management accountants turned their attention to providing information for planning and control purposes, including also non-financial measurements of performance (Chenhall & Langfield Smith, 2007). Following the focus on information for planning and control, was the idea that management accounting systems should be constructed based on the context, in this contingency theory, the purpose of measurement therefore also had a significant impact on the usage practices (Ittner & Larcker, 2001). In the 1980s, the focus shifted again towards operational management and focused on measuring and reducing waste in production process. Since the 1990s the research and practice of management accountants has turned towards emphasizing strategic goals by measuring value drivers to reach organizational goals and measure development on given strategies.

From the historical standpoint of management accounting research and practice, Ittner and Larcker, (2001), describe four different types of decision contexts that can also be characterized as design and usage purposes for performance measurement systems. They outline that the different contexts are: 1) cost determination (e.g. measure business results), 2) information for planning and control, 3) reduction of waste, and 4) strategic emphasis on value drivers. They highlight that research should clarify the misbalance between design purposes and the purposes for which the systems are actually used. Ittner and Larcker's (2001) view is also in line with Micheli and Manzoni's (2010) observations on the plurality of roles that PM system may have in organizations. The decision contexts for outlining the original purposes set for PM systems is a simplification, but provides framework for organizing the theory on different usage purposes. The design purposes illustrated by Ittner and Larcker (2001), have also been found to considerably effect benefits of performance measurement when measured on business results in empirical research (Bento & Ferreira White, 2010).

The above described decision contexts provide a suitable framework for structuring theory around usage purposes that are set for performance measurement systems. However, for the purposes of this study, the list of usage purposes was adapted and simplified to contain the following focus areas: 1) reviewing financial performance, 2) supporting decision-making, and 3) implementing organization's strategy. Ittner and Larcker's (2001) cost determination was converted into

reviewing financial performance to better reflect the PM system's usage for financial performance with also other means than cost reduction. In order to clarify and simplify the theoretical analysis, the purpose for 'reduction of waste', will not be assessed separately in this study. Linkages to advanced operational performance measures and cost-accounting will however be made when discussing performance measurement from operational perspectives. 'Strategic emphasis on value drivers' is in the literature review part expressed as 'implementing strategy'.

In order to develop a framework for categorizing usage of PM systems, the literature review will next briefly illustrate each of the above described performance measurement usage purposes, and identify some usage practices that relate to the purposes. Illustration of usage practices of strategic performance measurement systems will, in addition, provide background for analyzing usage practices related to the level of strategic usage.

### 2.2.1. Reviewing financial performance

Traditionally performance has been measured based on financial metrics, and financial measurements have been used to control managers, budgeting being the most common method for diagnostic control of managers. Financial measurements can range from simple outcome measures such as revenue, to summary measures such as profitability or net operating income. The use of financial measurements is integral in strategic performance measurement settings as well, since most strategies often are aimed at financial success. Kaplan and Norton (2001b) described the use of financial measures in the balanced scorecard in that they answer to the question, "If we succeed, how do we look to our shareholders?", thereby enabling managers to get short-term feedback of their past initiatives.

Relying on financial information for performance measurement, decision-making and control, has received a considerable amount of criticism. It is widely argued that by focusing only on financial performance metrics, the utilization of intangible assets is not captured (Johnson & Kaplan, 1987). Scholars in the late 1980's expressed their concern that financial metrics encourage managers to focus on short-term results and fail to manage their organizations by focusing on long-term

prospects (Kaplan & Norton, 1992; Johnson & Kaplan, 1987). Financial measures have also been criticized as being too ‘lagging’ and aggregated for providing sound basis for decision-making. However, it has been shown in empirical research that even if an organization has implemented non-financial KPIs to complement financial KPIs, managers often do not rely on non-financial measures of performance when under financial distress (Micheli & Manzoni, 2010). The implication from this is that financial measurements have characteristics that make them useful and appealing for managers.

Some of these characteristics might be that financial measurements can be seen as rather objective, reliable and verifiable (Ijiri, 1975). The cost of implementing financial indicators is also low. Data for creating financial KPIs is usually gathered in organizations anyway, and external auditing of financial reports requires that the quality of the data is at a high level. Perhaps for these reasons, among others, financial measures are also seen as powerful tools to legitimize decisions (Vaivio, 1995). Moreover, contextual factor may limit the needs and resources that organizations have for their performance measurement. For example, Hoque and James (2000) find a significant association between size and BSC usage; larger organizations are more likely to make more use of the BSC, implying that smaller organizations may have less measurement diversity. Also, Spechbacher et al. (2003), found that organizations operating in consumer and retail industry had a significantly lower adoption rate of the BSC.

Although seen as ‘old’ or ‘traditional’, some organizations are likely to utilize mostly financial metrics in their performance measurement practices. This can be explained by their positive characteristics and appeal to managers. In addition, contextual factors such as, company size and industry, are factors that may limit organizations’ needs and resources to implement more advanced PM systems. Considering these observations, it seems fair to assume that some organizations are tracking mostly financial information in their PM system.

### 2.2.2. Supporting decision-making and control

In response to the increased concern from scholars about the inadequateness of financial measurements in measuring performance and utilization of intangible assets, the use of non-financial measures was presented. The forerunners in this innovation being Johnson and Kaplan with their book 'Relevance Lost' (1987). They proposed that a selection of non-financial indicators should be employed and used beside financial metrics, and that using these measures in a balanced fashion would provide better predictors of the organization's long-term goals than short-term profits and financial measures. Also, more recent research is suggesting that greater measurement diversity in the form of non-financial KPIs, leads to more effective performance management (e.g. Hoque & James, 2000).

A system combining non-financial and financial measurements by itself is however not seen as a strategic system in most SPMS research. For example, in their more recent writings, Kaplan and Norton (2001b) highlight that many companies claim to have a BSC because they use a mixture of financial and non-financial measures. In contrast, a measurement system combining non-financial and financial measurements can rather be seen as a tool for operations management (Chenhall & Langfield-Smith, 2007), or a 'KPI scorecard'. Non-financial measures that have been proposed in operational performance measurement, include measures such as quality, inventory, material scrap, equipment maintenance and delivery throughput (Chenhall & Langfield-Smith, 2007).

To continue on definitions about the systems being named as 'KPI scorecards', in developments of operational measurement, also the use of cause-and-effect relationships between KPIs in terms of cost drivers, have been incorporated to the systems (Chenhall & Langfield-Smith, 2007). Kaplan and Norton (2001b) admit that such a system can be named as a 'balanced scorecard' but they are missing cause-and-effect relationships to strategic objectives and are not intended for strategy implementation, calling such a measurement system a "KPI scorecard". Implying that although usage practices might reflect the usage of a BSC, it is not to be considered as one, since the usage purpose is not to implement organizational strategy. The definitions of an SPMS in the

literature also emphasize that the used measurement framework should be mainly intended for measuring and driving strategy (e.g. Chenhall, 2005).

Use of PM systems to support decision making and control and not for strategic purposes, can be seen as ‘performance monitoring’ and as a form of diagnostic control. This sort of diagnostic system can, to a certain degree, be compared to the basic use of the BSC framework in Kaplan and Norton’s earlier writings, that is often referred to as an automobile’s dashboard. ‘KPI scorecards’ or ‘dashboards’ have become increasingly common tools for managers to implement, and they are often a summary of the most important (operational or strategic) KPIs. A dashboard -view of most used KPIs can offer an effective way to summarize and visualize information, and organizations have recently begun to introduce indicators for diagnostic reasons, for ‘performance monitoring’ (Micheli & Manzoni, 2010).

Taking into account that PM systems may have advanced characteristics and usage practices in terms of dimensions or the use of causal analysis (Chenhall & Langfield-Smith, 2007), but are not to be considered as an SPMS (Kaplan & Norton, 2001b; Chenhall, 2005), and that the PM systems can in practice play many different roles in organizations (Micheli & Manzoni, 2010), making a distinction between these types of PM systems and SPMSs, in terms of usage practices, can be rather challenging. However, in light of the above described observations, it would seem reasonable to assume that many organizations use their PM systems for creating information to be used for decision-making, managing operations and for diagnostic control, by combining non-financial KPIs with financial KPIs, while placing little emphasis on driving strategic objectives.

### 2.2.3. Implementing strategy

The next step in performance measurement innovations was in the 1990s, the evolution of more complex frameworks based on a balanced suite of measures that explicitly link those measures to strategy, systems that can be referred to as SPMSs. Some examples of techniques/frameworks developed are the performance prism (Neely et al., 2002), and of course, the BSC.



The term SPMS can be defined in many ways (e.g. Chenhall, 2005; Ittner et al., 2003; Hall, 2008; Tuomela, 2005), and different definitions also seem to have different things as determinants for assessing strategic focus in SPMSs. Ittner et al. (2003, p. 715) define SPMSs as systems that provide information for the firm to identify the strategies offering the highest potential for achieving the firm's objectives, and to align management processes, such as target setting, decision-making and performance evaluation, with the achievement of the chosen strategic objectives. In addition, hierarchical structure between KPIs has been recognized in the definitions, and defined as a system that translates business strategies into results by combining financial, strategic and operational measures (Hall, 2008). Chenhall (2005, p. 395), recognizes the variety of different kinds of systems and states that SPMSs can take many forms, but share in common a distinctive feature that they are designed to present managers with measures covering different perspectives which provide a way of translating strategy into coherent set of performance measures.

Further, the usage purposes, practices, benefits, and perceived satisfaction from performance measurement are expected to vary according to the level of strategic focus. Research suggests that the further the system is implemented, or the more coherent it is, the more benefits are likely to follow (Ittner et al., 2003; Speckbacher, et al., 2003). In order to study the level of strategic usage, it needs to be asked that how strategic is the system, and what usage practices can be used for determining the level of strategic usage. If some organization's PM system seems to be more strategic based on literature than others' – how does that affect the expected and realized benefits, and perceived satisfaction with the system? Is it so that the more strategic the system is, more benefits are reaped, and system satisfaction increases as is suggested in the literature (e.g. Hoque & James, 2000; Speckbacher et al., 2003). Also, particularly interesting is what sort of benefits and support organizations are able to get from their PM system across different levels of strategy implementation focus, and how.

#### *Level of strategy implementation*

In the following paragraphs, some ways to categorize usage according to the level of strategy implementation are presented in light of usage practices. It needs to be highlighted that the

objective is to find a way to study the level of strategic usage and sophistication of usage, not implementation level of a system in itself. It cannot be assumed that all organizations that do performance measurement would eventually reach the most sophisticated level of usage and strategy implementation, or that they would even need to, since various contextual factors can make it too costly or even suboptimal.

Kaplan and Norton (2008), take strategy as the starting point of developing a measurement system, when implementing the balanced scorecard. They present a model called ‘the six-stage closed loop management system for strategy implementation’, dividing the implementation process into four stages: 1) develop the strategy, 2) translate the strategy, 3) align the organization, and 4) plan operations. The more ‘in use’ phases of the model follow after these: 5) monitor and learn, and 6) test and adapt. Although Kaplan and Norton provide some practical examples on what to do on each stage of the above described model, many of the stages seem to not specify usage related topics, making it difficult to clearly articulate what aspects in usage practices should be tested in order to study the level of strategic usage. Also, the proposed model is more geared towards describing the first two phases of Bourne et al.’s (2000) implementation phases; development and implementation.

However, if a performance measurement system is developed to implement strategy by following the stages described in Kaplan and Norton’s model – the resulting measurement system would be likely to have a great degree of alignment between strategy, operations, and organizational resources (Kaplan & Norton, 2008). With some limitations, such a system would have a lot of potential also from the point of view of Ittner et al.’s (2003) requirements from an SPMS, allowing the organization to align management processes, with the achievement of chosen strategic objectives. Therefore, the above described type of performance measurement system would reflect the usage practices, and purposes, of an organization who’s SPMS is at a very advanced level when it comes to the level of strategy implementation.

Speckbacher et al. (2003) studied the use of the BSC framework in German-speaking countries and developed a typology of different phases of implementation. The phases reflect the sophistication of usage according to usage practices recommended in the BSC literature. They

propose that when organizations develop a scorecard, they often start with a selection of financial and non-financial measures to measure performance on multiple dimensions/perspectives. After this phase, they move on to using cause-and-effect relationships between measures to translate the strategy into operational activities. Finally, in phase III, they enforce the alignment and usage through communication, action plans and incentives. The three user types developed by Speckbacher et al. (2003, p. 363), are:

- Type I BSC: a specific multidimensional framework for strategic performance measurement that combines financial and non-financial measures.
- Type II BSC: a type I BSC that additionally describes strategy by using cause-and-effect relationships.
- Type III BSC: a type II BSC that also implements strategy by defining objectives, action plans, results and connecting incentives with BSC.

When broken down into specific usage practices, the framework categorizes BSC users according to specific usage practices which are: separating strategic measures into a specific framework for strategic performance measurement, the use multiple dimensions (perspectives), combination of non-financial and financial measurements, use of cause-and-effect relationships that describe strategy, definition of objectives and action plans, and the use of incentives.

This BSC -based typology is mostly in line with definitions of SPMSs presented earlier, with some components overlapping or going even further in sophistication. Surely such system is in line with Kaplan and Norton's (2008) management system for strategy implementation, especially towards phases II and III. It takes into account the multiple perspectives and translates strategy into a set of performance measures (Chenhall, 2005). The use of cause-and-effect relationships highlighted in the framework is also compatible with the SPMS definitions, requiring a combination of operational and strategic measures and to measure critical success factors regarding the implementation of strategy (e.g. Hall, 2008; Tuomela, 2005). On top of these, in Speckbacher's typology, the linkage between incentives and strategic measurements is also a part of the analysis. Although not mentioned in many of the definitions of SPMSs, the use of incentives to enforce managers with positive motivation is recommended in the literature (Malmi, 2001). Therefore, for the purposes of this study, Speckbacher's typology offers a suitable framework for analyzing the level of strategy implementation that is reflected in the usage practices.

To sum up, in light of contextual findings of for example Speckbacher et al. (2003), and Hoque and James (2000), it seems reasonable to assume that some organizations do performance measurement focusing mostly on financial measures. Another type, yet not strategic way to use performance measurement is for operational performance management described by Chenhall & Langfield-Smith (2007), with resemblance to Kaplan and Norton's (2001b) "KPI scorecard". Such measurement can be seen as usage that combines financial and non-financial KPIs. When analyzing the usage of systems that are more geared towards strategy implementation, a framework based on usage practices has been proposed by Speckbacher et al. (2003). The framework is built based on literature focused on the implementation of the BSC, but has much in common with more general definitions of SPMSs. According to the framework, users of SPMSs can be divided into three groups that reflect the sophistication of usage and alignment of performance measurement with strategy.

### **2.3. Framework for categorizing usage of PM systems**

The framework chosen for analyzing the usage of PM systems among QPR Software's potential and current customers is adapted from Speckbacher et al.'s (2003) typology and from Kaplan and Norton's views on different use stages of implementation of the balanced scorecard as described in the previous section of the study. The framework includes five categories, in which the first two categories are not to be considered as measurement systems that aim for strategy implementation. The first one being measurement that is mostly conducted based on financial measurement. The second category being measurement that combines both financial, and non-financial measurements. After these, strategic performance measurement practices are grouped into three different categories, based on Speckbacher et al.'s typology (2003). In this study, the categories are named: 1) financial measurement, 2) operational measurement, 3) strategic 1, 4) strategic 2, and 5) strategic 3.

The categorization is built so that for a respondent to reach the next level of usage category, a set of usage related criteria needs to be fulfilled. For example, the respondents falling into the usage category "financial measurement" is determined when setting the threshold for the "operational"

category, and the respondents falling into usage category “operational” is determined when setting the threshold for category “Strategic 1”, etc. This results into categorization where on each consecutive level, the respondent is fulfilling its own threshold in addition to all requirements set by thresholds before that level, building on top of the previous requirements. The framework for categorizing usage of PM systems among survey respondents is presented in Figure 1 below. A specific illustration of the how the framework is applied to the survey data, is presented in the methodology section of the paper.

<b>Usage category</b>	Measures performance with financial KPIs.	Measures performance with both financial and non-financial KPIs.	Includes multiple dimensions, uses a specific framework for strategic PM.	Describes strategy by using cause-and-effect relationships.	Measures strategic objectives and action plans, links incentives with strategic KPIs.
<b>Financial</b>					
<b>Operational</b>					
<b>Strategic 1</b>					
<b>Strategic 2</b>					
<b>Strategic 3</b>					

*Figure 1: Framework for categorizing performance measurement system usage.*

In the financial measurement category, the users are mostly using financial KPIs, and it can be expected that such organizations use the system for financial reporting to stakeholders and for decision-making on financial terms, with little focus on control or strategy. The key determinant was that the financial category includes mostly financial measurements in the PM system, which sets quite a low threshold for a respondent to move on to the operational category. In the operational category, respondents report that they measure performance both on financial and non-financial measures, but they do not have a specific measurement framework used for strategic performance measurement, and they have not arranged their measures according to different perspectives. The threshold for the next group ‘Strategic 1’, is steeper because of the transition to specific frameworks for strategic measurement and to including multiple perspectives. Users in

category ‘Strategic 1’, use a specific multidimensional framework for performance measurement that combines both financial and non-financial strategic measures. Threshold for a respondent to fall into the category ‘Strategic 2’ required using cause-and-effect relationships between measurements, meaning that strategic objectives are measured, action plans are made in order to reach strategic objectives, and that they have developed KPIs to measure their performance on those action plans as well. In ‘Strategic 3’ category, the users in addition to using cause-and-effect have also set target values for measurements based on strategic action plans, and have linked incentives with strategic KPIs.

The chosen framework is expected to differentiate users among QPR’s CRM contacts according to the sophistication of PM system usage practices. It is important to note that such a framework is a simplification of the real world, and that usage practices such as these do not reflect the respondents’ opinions on what the system is used for. E.g. organization might use a combination of financial and non-financial KPIs, with no specific framework for strategic PM or measurement between different perspectives, and still determine strategy implementation as the primary usage purpose of the system.

The framework’s simplification of the real world can be criticized also because of the fact that it doesn’t take into account cases where the usage could be quite sophisticated in all other terms, but is not sophisticated enough from the viewpoint of the specific usage practices that are applied for setting the threshold for subsequent usage categories. For example, operational performance measurement can be quite advanced, as Chenhall & Langfield-Smith (2007) point out that operational performance measurement has evolved a lot and can be very sophisticated in for example, measuring performance on multiple perspectives. Also, the use of incentives and its effect to PM system support and perceived satisfaction is likely to have an effect in all the usage categories, but is in this framework only included when determining the usage practices for ‘Strategic 3’ usage category. The effects of these usage practices can of course be studied within one usage category, but are not captured with the framework.

## **2.4. Performance measurement benefits**

This part of the literature review attempts to recognize key areas where performance measurement can be expected to generate benefits to their users, what aspects related to the systems' usage can be seen as influencing the realization of those benefits, and what factors may prevent the benefits from realizing to their users. First, the choices acting as the basis of the inclusion of different PM benefits, are presented, after which each benefit and associated usage practices, are discussed by focusing on each benefit in their own sections. Primarily, the findings made in this part of the literature review, are used to provide theoretical background for analyzing findings made in the in the multiple case study.

In empirical research that investigates the realization of promised benefits, the contradiction of whether to measure benefits and performance improvements in terms of financial performance improvements or by focusing on perceived, self-reported subjective benefits by users of PM systems, is often put forth. Advocators of hard, financial evidence on performance improvements and benefits, claim that financial results in terms of revenue growth, stock returns, etc., are the only objective way to find evidence on performance measurement benefitting its users. Advocates of using self-reported, subjective measures of performance claim them as useful since some activities cannot be measured with objective metrics, and that for some situations and levels of analysis there is no viable alternative (Wall et al., 2004). Much like the beneficial role of non-financial KPIs in understanding drivers of performance as opposed to financial metrics, analyzing only hard financial evidence is likely not to lead to finding the root causes related to systems usage practices contributing to the successfulness of performance measurement. Therefore, this study assesses benefits and performance improvements by studying self-reported and subjective views and experiences, reported by the survey respondents in the survey and case studies.

Usage purposes and expectations from the PM system become important determinants when analyzing users' satisfaction and gained benefits. Although the multiple case studies were targeted towards users in the largest category "operational", this part of the literature review will not be limited to finding benefits associated with PM whose primary goal is operational performance management. The categorization of PM system users made with the earlier developed framework is based on usage practices that the respondents have reported, not on the reported usage purposes.

The studied usage practices by themselves do not reflect the respondents' opinions on what the system is actually used for in practice, and what is expected from it. Also, as mentioned earlier, in empirical research it has been found that users of PM systems often have difficulty in determining the primary usage purpose of measurements and/or specific expectations from performance measurement (Tuomela, 2005; Micheli & Manzoni, 2010).

The benefits of implementing and using performance measurement systems is an area quite extensively covered in management accounting literature. The normative literature presents a wide selection of different benefits associated with implementing and using a PM system, offering certain structure to analyzing the different benefits. The normative process and resulting benefits of performance measurement, tend to start with efficient decision-making processes and diagnostic control (Chenhall & Langfield-Smith, 2007), moving on to communication and interaction based on the KPIs, finally enabling learning as a result of the interactions (Tuomela, 2005). In addition, it is often suggested that KPIs can be beneficial when communicating achieved results to different stakeholders and to gain legitimacy (Vaivio, 1995).

From the literature focusing on the use of PM systems for diagnostic control, as a decision-support system, or even as an information system (Malmi, 2001), it can be drawn that such usage can indeed make decision-making more efficient and informed (Chenhall & Langfield-Smith, 2007). Kaplan and Norton have suggested in their early writings, that the BSC is to be used for getting a clearer, more holistic view of the organization's status, comparing it to the 'cockpit' of an airplane. Much of the research on using for example non-financial KPIs to support more long-term view of performance can be attributed to the benefits of using PM systems as a diagnostic decision-support system. Ittner et al. (2003, p. 719) describe on an overall level, that the benefits that SPMSs are expected to bring to their users, are to improve communication of the specific actions that are required to achieve chosen strategy, motivate performance against goals, and to provide more rapid feedback on strategy. Also, Micheli and Manzoni (2010), draw from the literature that on overall level, if used appropriately, PM systems can be expected to: formulate, implement, and review strategy, communicate achieved results to stakeholders, motivate employees on all levels, promote performance improvement culture and foster organizational learning.



For the purposes of this study, it is outlined here that PM systems can be expected to have positive outcomes for organizations in four areas. Firstly, a PM system can provide benefits for decision-making and decision support, by providing a more comprehensive picture of the state of the organization. More specifically, they can be expected to make decision-making processes more efficient and effective, enabling diagnostic control. Second, through linkages between different organizational levels, objectives, and valued outcomes, it can provide benefits by acting as an effective tool for communication. PM systems can also be expected to increase the transparency of actions, which if used appropriately, can have positive organizational effects. Third, by establishing feedback and feedforward loops, and through interactive use of PM systems, they can foster organizational learning. Finally, information gathered with the PM systems can be seen to hold certain legitimizing power, and can be beneficial to rationalize and argument decisions to internal and external stakeholders.

In the following sections, the literature review will attempt to demonstrate key benefits of performance measurement systems' usage practices in the normative literature, and to recognize areas which might prove challenging or critical for obtaining those benefits in the empirical research, focusing on the previously outlined benefits.

#### 2.4.1. Decision-making

The benefits for decision-making, resulting from performance measurement can be rather many. Here it is outlined that for decision-making, PM systems can be seen to be beneficial to their users, by enabling diagnostic control, showing reasons behind performance levels through the use of cause-and-effect relationships, and by creating action based on latest information, i.e. information effectiveness.

##### *Diagnostic control*

The implementation of performance measurement systems is said to lead to better decision-making due to better view of the organizations situation and a better understanding of its operations. More

holistic view of the organization's operations enabling decision-making and reacting to problems was suggested as a key benefit of performance measurement by Kaplan and Norton, who referred to the cockpit of an airplane, showing key metrics for the pilot. An integral point behind this benefit has been the shift from measuring aggregated financial figures that are often seen as distant, historic and complex to controlling the causes of costs that follow from the operations of the organization (Chenhall & Langfield-Smith, 2007). The measurement of causes of costs requires the identification of the drivers of costs, which can usually only be captured with non-financial, and operations -based performance measures. Such measurement enables diagnostic control, i.e. reacting to immediate problems and deviations from standard performance, and fixing the problems at hand. Diagnostic use of PM systems is often seen as an efficient way for decision-making, as opposed to interactive use, where the focus is on fixing problems by improving processes so that the same problems wouldn't realize anymore. For example, Tuomela (2005) finds that interactive use of PM systems can be tiring and costly due to a lot of time being used in interactions based on the KPIs, which may decrease the efficiency and effectiveness of decision-making. In addition, if performance measurements are to be used interactively, only few measurements can be discussed and analyzed at a time.

Efficient diagnostic control and utilizing non-financial KPIs, however, sets certain requirements for the quality of the information. The use of non-financial measurements can have many challenges related to information quality, and the correctness of assumed causal relationships between operational activities and valued outcomes. The accuracy of causal linkages and correctness of information, can be seen as more important for systems that are used for diagnostic control. Particularly since diagnostic control requires that goals, strategies and critical success factors are explicit enough to make decision-making straightforward (Tuomela, 2005, p. 311). Similar to data quality, also the focus and emphasis between non-financial and financial metrics is important. Although focusing on operational performance might be more useful in situations of distress, managers tend to focus on common financial measures when faced with financial distress. It has been suggested that while it is important to design the PM system so that it includes both financial and non-financial KPIs, the use of the systems should be such that the emphasis to specific indicators is consistent, and that organizations should resist focusing on purely financial measurements when there are negative financial results (Micheli & Manzoni, 2010).

### *Cause-and-effect relationships*

As opposed to diagnostic control and decision-support, performance measurement can also be used to steer the organization. Having a PM system that would reflect and describe the organizations strategy or other valued outcomes and guide it towards them by aligning activities with the objectives, is one of the strongest benefits associated with performance measurement. Designing measurements that guide operations according to valued, high level outcomes, requires the formulation of cause-and-effect relationships between activities and objectives. In an SPMS, such chains of cause and effect are used to link strategic objectives with operational activities. If considered from the point of view of the dimensions in the balanced scorecard, such a system could support operational decisions, make predictions of outcomes given decisions and environmental conditions, and provide feedback for learning and performance evaluation (Malina & Selto, 2001). Causal linking between KPIs, is also often referred to when categorizing KPIs into ‘lagging’ and ‘leading’ KPIs, where the first ones are generally seen as historical and usually financial indicators, and the latter ones as operational, activity -based indicators. A leading indicator has strength in its ability to show for example operational problems in a manufacturing process before they realize as lost sales or increased operating costs.

The use of cause and effect relationships is a core feature of the BSC, and has even be seen as the feature that distinguishes the BSC from KPI scorecards (Kaplan & Norton, 2001a). It should however, also be noted that the method of using causal relationships between KPIs for creating effective scorecards to support valued outcomes, is not solely used for strategy implementation, but that it can also be used in systems that are less geared towards strategic goals – such as in function management in marketing, operations management, or HRM (Chenhall & Langfield-Smith, 2007). As a common feature, regardless of the objectives, is the recognition of the importance of measuring actual activities that are causally affecting performance, and not only aggregated historical and financial information.

Particularly when the system has a strong focus on strategy implementation and communication, the use of causal relationships can be challenging. Malina and Selto (2001) highlight that for a BSC to be effective, the measures in it should be accurate, objective and verifiable, and completely

describe the organization's critical performance variables. In practice, mapping chains of cause-and-effect that describe the organizations strategy or other valued outcomes, such criteria can be challenging to fulfill. The strategy itself might be unclear and the factors affecting it can be quite many. Capturing the essence of strategy into a PM system can be quite a challenge (Lipe & Salterio, 2002). Furthermore, the causality used in the BSC has been criticized as impractical and the logic of the cause-and-effect principle between different BSC dimensions, has been questioned (Norreklit, 2000).

On the other hand, it has been suggested that not all causal chains need to be perfectly accurate in describing all variables that affect performance. Bukh and Malmi (2005, p. 95), for example, suggest that, "...the idea of cause and effect in the BSC should be interpreted as a tool to identify most influential and realistic actions to be undertaken, not as a true representation of all prevailing complex interrelationships in any business situation.", implying that the purpose of BSC framework is not to act as a tool that could as such be fitted into any organization, but that the method of using causal chains between operational activities and desired outcomes has relevance from the practical point of view, when fitted with the organizational objectives and context. This observation is especially useful when considering fast evolving and changing industries, and strategies. Similarly, Bourne et al. (2014, p. 118) emphasize that: "...in fast changing environments, managers should take KPIs as indicators of performance, not real performance". Also, Kaplan and Norton (1996), state their' awareness that specifying causal relationships is not simple, but emphasize that managers thinking regularly and systematically about the implied linkages, is an improvement in most management review processes. These findings imply that the use of cause-and-effect logic is useful, but it does not necessarily need to be organized into specific dimensions but rather outlines that managers can benefit by thinking about causal relationships between valued outcomes, actions, and KPIs.

### *Effective information*

Another benefit, often suggested to result from the adoption of a PM system, is that it translates the information into relevant action and enables reacting to information in a timely manner. When used for diagnostic purposes, the measurement of activities rather than aggregated outcomes is a

key feature that enables the decision-maker to focus on specific, actionable information. The benefit of converting information into action is however also a benefit much affected by the PM systems' usage practices. Some key areas for creating action based on new information are; target setting and rewarding through incentives, quality of the reported data, and the amount of administrative work that goes into maintaining the system.

Target setting has a key role in motivating action. Malmi (2001) found that linking incentives with strategic KPIs is beneficial for steering managers' actions towards long term strategic goals. Also, Malina and Selto (2001) state that for a BSC to be effective, it should promote positive motivation. Further, they add, that the KPIs should reflect managers' controllable actions, targets should be challenging but attainable, and the KPIs should be linked with meaningful rewards. Targets and rewards have more effect if managers feel they can affect the measurements and achieve the targets while they need to be aware of the assessment criteria and the resulting reward or penalty needs to realize promptly. These attributes should be especially important for motivation based on the KPIs when they are used for diagnostic control and performance evaluation. Malina and Selto (2001) found that the BSC had negative effects if measurements were inaccurate and if the targets were based on inappropriate benchmarks.

In addition, in environments that are quick to change, target setting can be particularly challenging. To reflect and drive the organization towards its valued outcomes, strategic performance measures should be changed when the strategy changes (Otley, 1999). This can be problematic for target setting in companies whose environment and strategy is quick to change. Such changes usually require that new KPIs that act as basis for performance evaluations need to be created, which is problematic since the lack of measurement tradition decreases confidence and makes target setting more difficult (Vaivio, 1995). However, when used interactively, the target levels and data quality, might not have such high relevance. Tuomela (2005) finds that when managers used the PM system interactively to learn about strategy, the importance of rewards was decreased. He suggests that if managers themselves have created the measurements, they are less reliant on rewards tied to the non-financial KPIs. If rewards are based on financial targets, and managers have been involved in creating measurements that should causally reflect a strategy that maximizes financial performance

in the long term, they rely that their system can generate results also in the measures by which they are rewarded.

Data quality can be seen to increase the use of non-financial KPIs, and thus increase the usage and effectiveness of non-financial KPIs. Information quality is sometimes subjective and dependent on the usage purpose of the information, it is however related to value and usefulness, or relative importance of the information for its user. For example, Ittner and Larcker (2001), found that for most performance measures, managers rated the quality of the information much lower than the importance of that measure. They conclude that studies investigating the use and benefits of performance measures, are incomplete without considering how well the information is measured (*ibid.*, p. 384). Also, Malina and Selto (2001), found that in their studied case organization, the dimension of learning was dropped out of the BSC due to low information quality. Thus, information quality is an important prerequisite of effective performance measurement and management.

In order to react fast to problems and deviations, performance information should be made timely available, which can often be affected by the amount of administrative work related to PM system usage. It is argued in management accounting research that developments in information technology haven't significantly affected management reporting (Granlund, 2011), implying that the required workload and administrative costs related to reporting, hasn't decreased significantly. For example, Tuomela (2005) found that the implementation of a new SPMS resulted in increased workload of reporting tasks for accountants. This poses a challenge for effective and timely use of PM systems, i.e. to the ability to react fast to new information and to make corrective actions.

#### 2.4.2. Communication and transparency

In SPMS literature, particularly focusing on the use of the BSC, it is often suggested that the PM system enables communication and transparency between different dimensions of performance. For example, Kaplan and Norton have stated that one of the most important benefits of the BSC is its ability to communicate strategy. They claim that it does that by clarifying the organization's

strategy and by making the KPIs reflect the strategy. It has also been suggested that SPMSs are expected to improve communication of the specific actions that are required to achieve the strategy, by tying together information systems, goals and objectives, and performance evaluation (Ittner, et al., 2003, p. 719). Therefore, stronger linkages between strategies and value drivers can be seen as an integral enabler of better, more relevant, communication. This can be seen as stemming from the use of scorecards that combine information and KPIs from multiple perspectives and organizational levels, and by combining financial and non-financial measures.

The normative literature gives overall recommendations on aspects that PM system should take into account to enable the benefits of communication and transparency. For example, Malina and Selto (2001, p. 51) have outlined a set of criteria that a PM system would need to fulfill in order to act as an effective organizational communication tool: valid messages (reliable, understandable, trustworthy), support of organizational culture (existing or changing) and knowledge sharing (including dialogue and participation). They base their criteria on valid messages by arguing that individuals use the measurements and communicated information more if the messages are perceived as understandable and trustworthy. An important part being that the messages should be concise, and the terms should be clearly defined. The support of organizational culture is seen as an important criterion in order to avoid communication and messages from management that are in contradiction with the organization's overall values and culture. As their third enabler, knowledge sharing in communication is seen to contribute greatly to the benefit of learning and transparency, which will be discussed in the later paragraphs. Other, overall characteristics of effective organizational communication are routineness, predictability, reliability, and completeness (Goodman, 1998).

The benefit of enhanced communication and transparency is often put forth, and the literature seems to present sets of criteria on attributes that effective communication requires, but few normative or empirical studies find practical examples of what usage practices or specific techniques, are related to more effective communication and transparency. Contribution to actual usage practices can however be drawn from these observations; the usage of the systems should take into consideration the validity of the information, overall fit with organizational values, and users should have informal and formal interaction with others based on the information gathered

with the measurements. More concrete recommendations on usage of PM systems can also be drawn from the challenges. Malina and Selto (2001) found that main challenges with PM system implementation and usage was one-way, top-down communication about the BSC. Together with inaccurate measurements and inappropriate benchmarks these attributes had negative impact on the BSC's benefits as a communication and management control tool. The findings suggest that the implementation of the PM system should allow bottom-up communication as well as ensure appropriate benchmarks.

Some suggestions relating to the actual usage practices can also be found from the literature focusing on operational performance management. In PM aimed at managing operations, the visualization and timely communication of performance, has been seen as an integral enabler of effective operations management. In response, the use of performance dashboards, or "KPI scorecards", has been increasingly seen as an effective way to visualize and summarize performance in key areas, and organizations have been eager to implement these kinds of performance monitoring systems (Micheli & Manzoni, 2010). Therefore, for effective communication, especially in the context of diagnostic PM systems, visualization and summarizing the information can be seen as means to increase the systems effectiveness in communication and transparency.

Based on Ittner et al.'s (2003) view that an SPMS is effective when it is implemented so that it ties together the information systems, it can be suggested that information systems research is a field which might have potential to find practical solutions for effective communication processes. It has been recognized among scholars that management accounting research is quite distanced from information systems research, although the design, maintenance, and development of various information systems has become an increasingly important role for management accountants (Granlund, 2011). Although the current study is not focused specifically to the use of information technology in PM, it needs to be recognized that information systems research, development and implementation, have significant potential in streamlining and making PM systems function effectively, enabling effective communication and feedback on performance (Granlund, 2011).



As a more overall factor affecting the benefits related to communication and transparency, is the amount of KPIs that is used. It needs to be highlighted that the amount of KPIs incorporated into a PM system, contributes strongly also to other benefits discussed in this literature review, such as decision-making, planning and learning. Each individual's cognitive capabilities are limited, and can only process a reasonable amount of information to make analysis and plan corrective actions. This sets a challenge for first of all the understanding, but also to communication and transparency of performance.

Malina and Selto (2001) bring up that for a BSC to act as an effective management control device, it should completely describe the organization's critical performance variables, but should be limited in number to keep the measurement system cognitively and administratively simple. As noted earlier, the implication is that a PM system can rarely be a completely exhaustive and accurate reflection of the complexity of the organization's tasks, since the amount of KPIs would grow too large to understand. Surely individual managers may use rather advanced KPIs that reflect the performance in their area of expertise but it is likely that such measurements are not used for communication across different functions, organizational levels, or strategic objectives. This has implications particularly for transparency since a seemingly transparent set of information can also be hindered by including too much information.

Similar to the hindrances that the amount of KPIs can create to transparency and communication, is also the clarity of terms that are used. Goodman (1998) suggests that for effective communication, the terms should be clearly defined. If KPIs are defined ambiguously and there is no clear, organization-wide terminology in use when discussing them, their relevance for communication may be decreased, affecting negatively to transparency and learning aspects as well. For example, Lipe and Salterio (2000), found that managers have cognitive difficulties when working with unique (situation specific) measures, and that they preferred using common measures that were same for different situations, implying that clear determination of terminology and KPIs, can have a positive effect in decreasing the managers' bias to use common measures.

### 2.4.3. Learning

The implementation of a new PM system, is often recommended as a tool of introducing a new strategy to an organization. Particularly in the context of SPMSs, it should be designed and implemented in accordance with new strategy. Although by no means simple, it has been claimed that such a practice can provide significant benefits and organizational learning for the organization implementing the system. If put simply, the design phase can be seen as a principally cognitive exercise to translate different views into business objectives and measurements (Bourne, 2000). However, particularly for SPMSs, such process can require a lot resources and planning from many organizational levels, and across functions. In the process, organizations need to start thinking about strategic or other valued outcomes, and the contribution that different organizational functions and processes have for reaching those outcomes.

This cognitive and interactive exercise can create learning of the new strategy, but also about the organization's existing processes and help recognize non-value adding parts of the processes. The BSC literature even suggests that it is as much the process of establishing a scorecard that yields the benefit, as the resulting measurement system (Otely, 1999). As an example, the exercise can increase managers' understanding of how good the strategy is, or how would improvements in, for example on-time-delivery, affect customer satisfaction. As discussed in the decision-making -part of the literature review, a key enabler of such learning is the use of cause and effect relationships, and the related cognitive exercise.

The literature suggests that strategic learning and knowledge sharing is best created when accounting systems are used interactively (Tuomela, 2005; Simons 2005). In interactive use, it is recommended that controls and measurements should be implemented by acknowledging that human beings have intrinsic motivation, and by promoting learning in the process (Argyris, 1990). In such process, the individuals involved are less likely to have defensive routines, or tendencies to 'cover things up'. In his longitudinal study of the implementation of an SPMS in a Finnish manufacturing company, Tuomela (2005) found that the managers of the company used cause and effect relationships in KPIs interactively to test their assumptions of means end relationships. He also highlighted the contrast of this interactive process to diagnostic use of the PM system (*ibid.*, p. 311), "A cockpit –like model would not allow double loop learning from strategy, and bringing

the assumed cause-and-effect relationships up-front is an issue of paramount importance from the strategic learning perspective.”

A PM system has potential for enabling learning also in situations where necessarily no new strategies or objectives are introduced, especially if used routinely and interactively. As outlined in the previous section, effective use of PM systems as communication devices can also enable the sharing and creation of knowledge, i.e. resulting in better knowledge management. In PM systems, individuals’ often tacit knowledge is transformed into objective information in the form of measurements. The tacit knowledge needs to be refined and reshaped to fit the objective and standardized criteria set by specific measurements, but the process encourages and enables the sharing and collecting of individuals’ experiences (Malina and Selto, 2001). Also, Vaivio (2004) highlights that the use of non-financial KPIs in an interactive way can provoke discussions that consequently can lead to more effective knowledge management by making tacit knowledge more explicit and manageable.

Otley (1999), analyzes the potential and use of feedback loops in control systems and distinguishes between feedback loops and feedforward loops. Feedback loops are in their most traditional context used to compare information on actual performance against target levels, feedforward loops can on the other hand, be seen as controls that are used to predict the need for corrective actions. In addition, less formal feedback signals have a significant role (Otley, 1999). As a generalization, the concepts of single-loop learning and double-loop learning, are related to the concepts of feedforward and feedback loops, and are connected to either diagnostic, or interactive use of controls. Interactive use of controls is focused on double-loop learning, questioning the KPIs, and assessing their assumptions on causality. In the literature, diagnostic use of controls is seen to facilitate less learning, and when learning occurs it is likely to fall under the concept of single-loop learning.

However, the implication is that the existence of an effective diagnostic process for assessing performance and reacting to deviations from target levels, is a key enabler of discussions, knowledge sharing (interactive use), and ultimately double-loop learning. I.e. in order to have meaningful feedforward processes and double-loop learning, an effective diagnostic feedback

process should be in place. Also, Micheli and Manzoni (2010) state that the balance between diagnostic and interactive uses of PM systems has relevance for the PM systems ability to have an active role in enabling organizational learning and change.

As a final note on the benefit of organizational learning, it needs to be highlighted that the process of learning and constant improvement of PM systems is no simple task. Strategies, key success factors, or other valued outcomes set for performance measurement, tend to develop over time, as more is learned about the organizations environment, strategy, operations, competitiveness etc. As a consequence, the scorecards and PM systems are likely to continuously change. Therefore, a key challenge in PM is learning and continuous improvement in itself, as it requires discussions, interactions and an environment that promotes learning in addition to efficient diagnostic forms of control. Otley (1999) points out that the dynamic nature of scorecards and PM is recognized in the literature, but that there is rather little guidance on how this should be done. Similar observation was also made by Tuomela (2005) who criticized that the literature on PM systems is rather silent on suggesting proper mechanisms for improving and updating PM systems.

#### 2.4.4. Legitimacy and argumentation

Performance measurement systems can also benefit their users by providing a tool to rationalize, legitimize and report actions, developments, and performance to internal and external stakeholders. When examined in the light of the rational paradigm, such benefits and usage appear as rational in the normal setting, but can also be used to drive agendas, which do not always correspond to the rationality for the organization as a whole. For example, Micheli and Manzoni (2010), outline that KPIs can be communicated in order to demonstrate results within the organization or to its external stakeholders. They, however, recognize that the usage of performance information can also be symbolic, where the aim can be to increase the relative power of a business unit or a department. In such cases, performance measurement can be referred to as a ‘tool for power’. Albeit such behavior might not always be desirable, and users of PM systems should be aware, and consciously avert the negative impacts such behavior may have, they

highlight that for a PM system to successfully act as a tool for power, it is important that the performance indicators are linked with strategy and that they are considered in strategic reviews.

Such symbolic or non-rational usage of performance data can also occur on the individual level. Wiersma (2009) studied how, and for what purposes do individual managers use the BSC. Among other purposes listed, their finding is that managers use the BSC most of all for decision support, which includes problem solving and decision-rationalization. They also recognized self-monitoring as another integral purpose for which the BSC was used. I.e. on individual manager level, there are likely to be benefits for decision support in the way the indicators offer a way to solve problems, but moreover to monitor one's own performance and rationalize decisions. The observations and findings made by Micheli and Manzoni (2010) and Wiersma's (2009) imply that performance indicators can benefit their users on individual level in the form of self-monitoring and decision rationalization, as well as in cross functional and vertical communication on their performance and in driving organizational agendas. The observations are, in part, overlapping with the findings in the literature on performance measurement systems' power in communicating managerial issues across an organization, as discussed in the previous sections (Malina & Selto, 2001).

### **3. METHODOLOGY**

This chapter discusses the methodological choices of the study. Subchapter 3.1. presents the research design by introducing the two research methods. In the second subchapter 3.2. the process of data collection will be explained by first focusing on the survey and applying the earlier developed framework, and then on the interview case studies. In the last subchapter, 3.3., the limitations and trustworthiness of the chosen methods are discussed.

#### **3.1. Research design**

This study was conducted in two phases; first a survey was prepared and sent to QPR Software's CRM database to explore what the PM systems are used for, how sophisticated usage practices the users have, and how satisfied they are with their systems. The aim of the survey was also to categorize the respondents based on the earlier developed framework that should reflect the level of sophistication of usage practices in light of PM literature. From preliminary analysis of the survey results, it was identified that the largest group among the respondents was 'operational', i.e. usage that combines non-financial KPIs with financial KPIs, but is not used specifically to measure strategy. In the second phase, a multiple case study was conducted with respondents from the operational category in order to further increase understanding on what the systems are used for, what sort of benefits and challenges the users are experiencing, and to recognize key usage practices affecting the benefits and challenges. Therefore, the study is a multimethod study that utilizes an explorative, quantitative data set gathered with the survey, and semi-structured interviews with the selected survey respondents from the category 'operational'. Further, the study utilizes triangulation between the methods in order to increase the validity of the findings. Next, each methods' suitability and relative strengths and weaknesses, will be briefly discussed in relation to the research objectives.

##### *Survey research method*

The survey was chosen as the research method due to its effectiveness in gathering a large set of data that has a high level of objectivity, i.e. that all responses are standardized (Van der Stede et

al., 2005). In comparison to field research, the setting of the survey is the same for all respondents and therefore the resulting data is quite standardized and also controllable (Gable, 1994), in this case, enabling the categorization of users based on their usage practices, as well as analyzing the reported satisfaction between the categories. A clear research objective to avoid confusing respondents with irrelevant questions, is an important factor for the generalizability of survey results (Van der Stede et al., 2005). Although the survey's objective was to explore rather than generalize, the generalization of the aim of the survey was clearly highlighted for the respondents.

The survey as a research method has also been criticized quite considerably in management accounting research. A key problem with the survey approach is that the beforehand decided format and design cannot be modified based on new interesting information or corrected if some points are left out (Van der Stede et al., 2005). This results in the survey having a low level of discoverability, since it is inflexible to discoveries made during data collection (Gable, 1994). Another issue with the survey is its weakness to take into account the underlying factors affecting the studied phenomena. It often provides only a snap-shot of the situation at a certain time, and some variables such as evidence on cause and effect may not be possible to measure by quantified survey data (Gable, 1994).

Since the survey was used as an explorative tool to find out how PM systems are used among QPR Software's customer base, the research design allowed some flexibility to take into account discoveries made with the survey before conducting the multiple case studies. For this study, the problem with the survey's weak power to describe what factors are actually affecting levels of satisfaction with a PM system is especially relevant, since PM systems are deployed in many different ways and their usage is dependent on the primary purpose of usage and the context in which they are applied. For these reasons, the survey was first used to explore how the systems are used, and for selecting interviewees to the multiple case studies. Therefore, concerns of understanding the underlying factors in usage practices contributing to different benefits and challenges encountered with PM systems among the respondents were addressed with the multiple case study.

### *Multiple case study*

The multiple case study was conducted as semi-structured interviews with selected respondents to the survey from the operational category. Main objectives of the multiple case study were to understand the context and usage purposes of the PM systems, what benefits and challenges the respondents are experiencing, and what usage practices are affecting them. The benefits of qualitative case studies are often praised in management accounting research. The leading benefit of it being that since management accounting is a dynamic and organizationally embedded phenomenon, case studies offer the best way to produce theoretically valuable interpretations (Vaivio, 2008). Case studies are focused on understanding dynamics within a single setting. In this study, the usage of PM systems is studied in five different organizations, offering a broader view on the diversity of usage practices among the respondents, however decreasing the depth of the analysis in the sense that only one interview was conducted from each organization. Findings from each case will be studied as separate, but common factors in PM system usage and benefits will be analyzed in the analysis part.

Moreover, the case studies were chosen as a suitable method for increasing the understanding of how the PM systems are used in practice, since it can be seen as a method that offers possibility to understand the nature of management accounting in practice, in terms of techniques, procedures and systems which are used, enable to distinguish the formal accounting systems which senior managers believe are used, and the ways in which they are actually used (Scapens, 1990).

Case study approach has also been criticized in management accounting research about how its findings can be linked to existing theory, and to the generalizability of the information gained. It is difficult to clearly link a case study's contribution to the existing theory and literature, since the generalizations made are only applicable within the context of the specific case (Scapens, 1990). Case studies also have the shortcoming that they require a lot of interpretation by the researcher. It has been claimed that a case study is always result of how the researchers has interpreted the social reality of the organization studied, and in this sense, there isn't such a thing as an objective case study (Scapens, 1990). However, in this study, it is expected that the multiple case study material will bring valuable insight to the underlying factors related to the PM systems' usage practices, and organizational context.



Although not new, method triangulation has been an increasing trend in management accounting research (Modell, 2005). It is suggested that by combining the two methods with theoretical background, it is possible to overcome problems related to both methods. I.e. where quantitative methods are weak, qualitative methods are strong and vice versa. Modell (2005), suggests that research utilizing method triangulation in a balanced way, emphasizing both theory testing and theory development, can take more potential validity threats into consideration. In addition, the research design of this study is geared toward ex post resolution, since triangulation is done by first conducting a survey with an established framework to assess and explore the behavior of a group. After this, inconclusive findings with preliminary hypothesis are investigated by conducting case studies. The method can potentially be rewarding especially from theory building perspective, but costly and complex due to ex post validation (Modell, 2005, p. 251).

### **3.2. Data collection**

This part introduces the process of data collection, by first presenting how data was collected with the survey, and how the developed framework was applied to the survey data, after which the data collection process and structure of the interviews is presented.

#### **3.2.1. Performance measurement survey**

The collection of data via the performance measurement survey was conducted in collaboration with QPR Software. In discussions with QPR Software, it was brought up that surveys about performance measurement systems' usage had been made in the past as well, and that such a survey had not been conducted for a couple of years. Therefore, the method was seen as a natural way to gather exploratory data about performance measurement practices among QPR Software's customer base. More specifically, a point of interest was the contacts' usage practices around QPR Software's product: QPR Metrics' -offering, which fitted well with the aim of understanding how sophisticated the usage practices are. Specifically, the Metrics -product offering is divided into four different modules: 1) strategy execution, 2) operational performance management, 3) people performance management, and 4) quality management. Many of the observations and analysis

made based on the survey, were also part of an assignment to present the results to QPR Software's partners in 'QPR Partner Summit' in the spring of 2016.

Preparation of the survey began right after preliminary discussions with QPR Software had taken place in fall 2015 by building the theory for developing a framework for categorizing the respondents' usage practices from the literature. Taking into account the method's weakness in the ability to change or correct the format in light of new information (Van der Stede et al., 2005), many iterations between different versions of the survey were made together with QPR Software and instructing professor. The survey was also tested among the researcher's colleagues in order to make sure that the structure and terms are understandable, and that answering the survey would take no longer than 12-15.

Finally, the survey was published and sent to the contacts in March 2016, and closed in April 2016. Since the data received from the survey served the purpose of exploration on the usage practices among QPR Software's customers and potential customers, it was sent to all of QPR Software's CRM contacts, and received a total of 80 responses. In comparison to the number of CRM contacts, the response rate was low. This was however, not seen as problematic since the objective was to first explore the respondents' usage practices, after which the multiple case study was devised to understand the usage among the most represented category.

The first part of the survey was focused on gathering background information of the respondents themselves, and their organizations. In the second part, respondents were asked to assess the purposes and objectives of their performance measurement, and more general usage practices of their PM systems, such as usage of specific PM frameworks/tools and the use of professional software for PM. In the third section, performance measurement practices were questioned under three themes: people performance measurement, measures/KPIs, and scope of performance measurement. The concluding section of the survey focused on user satisfaction, perceptions and experiences.

In order to analyze the perceived satisfaction and outcomes of PM system usage, the purposes for performance measurement were asked in the second part of the survey. This was determined

because the particular purpose for which the PM system is used, determines the strategic outcomes of PM system usage (Chenhall, 2005), which in this study was the perceived satisfaction with the PM system. In the survey, the list of usage purposes was adapted from Ittner and Larcker's (2001) design purposes for PM systems to contain the following usage purposes: 1) reviewing financial performance, 2) supporting planning and decision-making, 3) controlling organization's processes, 4) reducing waste, 5) driving organization's strategy, and 6) managing customer and/or supplier relationships. The respondents rated the importance of each usage purpose on Likert scale of 1-5.

Perceived satisfaction with current PM system was measured in the survey by focusing on three common satisfaction attributes related to performance measurement: 1) information quality, 2) information effectiveness, and 3) overall satisfaction. Respondents were asked to rate their satisfaction on the listed attributes on a Likert scale between 1-7. Satisfaction with current PM system was also measured in the survey by introducing a set of performance measurement objectives / goals, and asking the respondent to rate the support they've received from their PM system in achieving those performance goals. The list of performance measurement objectives was adapted from Speckbacher et al.'s (2003) research, with which they measured the PM benefits of BSC users. The list applied by Speckbacher et al., contained a total of 17 different benefits. For the purposes of this study, the list was however adapted and shortened to include 10 most common ones to make it easier and faster for the respondent to rate the support from PM system in achieving each benefit (see Appendix 1 for survey questions). The respondents were asked to rate the support from PM system in achieving the benefits on a Likert scale between 1-5.

### *Applying the framework*

The framework was applied to the data received from the survey by assessing the specific usage practices presented in the framework so that the respondent needed to fulfill the criteria outlined for the usage category. In the financial category, usage related practices that would tell about the sophistication of usage, such as the use of cause-and-effect or the inclusion of incentives were not considered, rather, the key determinant was whether the respondent utilizes mostly financial KPIs in their performance measurement. This set quite a low threshold for a respondent to move on to the operational category, who reported using both financial, and non-financial KPIs. The threshold

for the next group ‘Strategic 1’, was steeper, because of the transition to ‘specific frameworks for strategic measurement’.

As a distinction to Speckbacher et al.’s (2003) research, the determination of a ‘specific framework for strategic performance measurement’, is handled differently in this study. Speckbahcer et al. (2003), use a questionnaire to determine the respondents’ familiarity with the BSC framework and chooses to analyze only those who report having implemented the framework for PM. By doing so, they assume that such companies have differentiated their PM system as a specific strategic framework for PM, and rely on BSC users actually using their PM system as a device for strategy implementation, as intended by Kaplan and Norton. However, Kaplan and Norton (2001b) have also pointed out that many organizations can use a mixture financial and non-financial measurements and claim to have a BSC, and that their idea of the concept goes far beyond this.

In this study, the use of a ‘specific strategic performance measurement framework’ was determined by an explicit question in the survey, where the respondent was asked to choose from two statements that best describe the nature of their performance measurement. The statements used for determining the use of a specific framework for strategic PM were, 1) "We monitor our operations through KPIs that give us information about our operations, finance, and overall performance, this enables us to stay on track of what is going on in the organization, and provides data to support managerial decision-making.", and 2) "In addition to operational KPIs, we have also separated a set of strategic measures (e.g. strategic performance scorecard), which have been developed in order to reach our strategic objectives. This is the most strategic performance measurement system in our organization, and it is used to steer, measure and communicate strategy." Between the statements, the first statement reflects usage where strategic performance measures are not separated into a specific framework, and the latter statement reflecting usage where it is.

The process of categorization and the usage practices –based criteria used, with references to specific survey questions is illustrated in Table 1 below. Referred survey questions are presented in Appendix 1, ‘Performance measurement survey’.

Usage category	Usage category description	Survey requirement / threshold
<i>Financial</i>	Performance measurement is focused on financial KPIs.	Reports that 80% or more of all KPIs used are financial KPIs (Survey question 3.2.2.).
<i>Operational</i>	PM system includes non-financial KPIs.	Reports that over 20% of all KPIs are non-financial KPIs (Survey question 3.2.2.).
<i>Strategic 1</i>	A specific multidimensional framework for strategic performance measurement that combines financial and non-financial strategic measures.	Reports using a specific framework for strategic PM (Survey question 2.6.).  Reports measuring performance on 4 or more dimensions (Survey question 3.3.1.).
<i>Strategic 2</i>	PM system that describes strategy by using cause-and-effect relationships.	Reports using cause-and-effect relationships. (Survey question 2.10.)
<i>Strategic 3</i>	Strategic PM system that implements strategy by defining objectives, action plans, results and connecting incentives with strategic KPIs.	Reports that strategic objectives and action plans are measured. (Survey questions 2.7. – 2.9.)  Reports that at least ‘some but not all incentives are tied with KPIs which are included in their most strategic set of KPIs.’ (Survey question 3.1.3.)

*Table 1: Survey requirements for each usage category*

### 3.2.2. Multiple case study

After receiving the data gathered with the survey, preliminary analysis was done based on the survey results, focusing on basic demographics of the survey respondents, and moreover, on establishing a distribution of respondents between different usage categories (financial, operational, and strategic 1-3). In the preliminary analysis, it was found that the largest category among the respondents was ‘operational’, i.e. usage in which financial KPIs are complemented with non-financial KPIs, but are not separated into a specific framework for strategic PM. The interviews were devised to gain deeper understanding of the usage purposes, benefits, and challenges, encountered among the largest category ‘operational’. A multiple case study was seen as a suitable method to gather a diverse set of qualitative data about PM system usage among the category. Therefore, the interviews were targeted to respondents from the category operational, with respondents who had stated their willingness to take part in an interview at the end of the

survey. The objective was to gather the qualitative data by interviewing five to seven respondents from different organizations. In order to get a diverse view on the different usage practices among the operational category, the interviews were also targeted to organizations that were as different between each other as possible. The factors used for differentiation between the organizations were: 1) size (number of employees), 2) industry, and 3) sector (private/public).

In order to reach the target of 5-7 interviews that would fit the defined criterion, the search for interviews was partly expanded outside first round respondents to the survey. In this stage, an opportunity to make a more longitudinal case study on PM practices at a construction firm was opened to the researcher. The set of data gathered from the construction company can be regarded as more longitudinal when compared to the other cases in this study, since a total of three interviews were conducted about PM practices with three different people in the organization. With the survey's purpose as an explorative observation tool, it was not seen that gathering a similar data from this organization with the survey and then interviewing, would decrease the validity of the study's findings. The ex post added organization was a customer of QPR Software, and fitted well both with the usage category criteria, and was different in terms of size, industry and sector from other organizations already interviewed.

With the added set of data in the form of survey responses and interviews, the number of qualitative data included interviews from five different organizations. The five organizations studied included: 1) a small private manufacturing company of logistics machinery, 2) supplier performance management in an international manufacturing company (Metso Oyj), 3) A public university of technology, based in Lithuania, 4) a large public company in travel and transportation industry, based in Finland, and 5) Finnish business unit of a large multinational construction company.

All interviews were conducted with the same person who had originally taken the survey. Interviews with respondents who were based in Finland were conducted as face-to-face interviews in Finnish, and interviews with respondents from other countries were conducted via Skype in English. The structure of the interviews was divided into four sections. In the first section, case organization's background was discussed to better understand the context of performance

measurement. In this section, also the primary usage purpose and the interviewee's role in the organization, and in relation to the PM system was discussed. After the background section, the benefits from PM and reasons for attaining those benefits were discussed. In the third section, the focus turned to the challenges that the respondents were facing with their PM systems and possible reasons behind them. The concluding section of the interview focused on the future development of PM system, in order to further increase understanding of the expectations that users have from their PM systems.

### **3.3. Trustworthiness of the study**

In this study, the survey's objective to explore rather than generalize, is an important distinction to most survey research conducted in management accounting research, and needs to be highlighted when assessing the generalizability of the findings. Diamond's (2000) legal framework is applied here to assess the quality of the survey research conducted in this study. The framework's usability in analyzing the quality of survey research in management accounting has also been recognized and applied by Van der Stede et al. (2005). It consists of five categories: 1) purpose and design of the survey, 2) population definition and sample selection, 3) survey questions, 4) accuracy of data entry, and 5) disclosure and reporting.

The purpose of the survey in describing performance measurement systems' usage practices, sophistication of usage practices, and level of strategic usage, was stated clearly to the recipients in the beginning of the survey to avoid misleading the respondents. The level of analysis based on the survey was organizational rather than individual, which weakens the validity of the study since a single individual often cannot reflect the way the systems are used and perceived in the whole organization (Young, 1996). However, the studied usage practices are likely to vary depending on the user, and the study's method for determining the satisfaction and benefits in performance measurement is done based on subjective and self-reported benefits rather than based on hard (organization -level) metrics.

Studying the use of PM systems in a survey can be challenging when it comes to the survey questions definition, and more specifically, to the occurrence of response error. Response error threatens internal validity if respondents make guesses because they don't understand the questions (Diamond, 2000). Particularly in the case of PM systems, this might occur when multiple different scorecards are used at different organizational levels, making it difficult for the respondent to choose which scorecard should be used as the basis of answering the survey questions. Similar to Speckbacher et al.'s (2003) survey study, it was here attempted to increase the internal validity by instructing the respondent to consider their most strategic performance measurement system applied on the strategic business unit level in the beginning of each section of the survey. In addition, multiple iterations were done and the survey was tested with the researcher's colleagues to make sure that the questions would be as clear as possible.

Accuracy of data entry was increased with standardized online -based survey. Finally, the respondents had the choice of responding anonymously, however, basic background information of the respondents' organizations was required. In addition, the selection of respondents to be included in the case study -phase of the data collection process, was done among those who had stated that they were willing to take part in an interview, and their individual survey responses are not linked and disclosed in the case descriptions presented in this study.

The trustworthiness of the findings made in the case study phase of data collection process is here analyzed based on four main threats for validity and reliability in field research, outlined by McKinnon (1988): 1) observer-caused bias, 2) observer bias, 3) data access limitations, and 4) complexities and limitations of the human mind.

The relationships between the researcher and the interviewees can be seen to have been very distanced. No previous connections were between the researcher and the interviewees, since the interviewees were chosen from the survey respondents. In addition, there were no reasons for the interviewees to view the researcher as a 'management spy', and the objective of the research was stated clearly to the interviewees in the beginning, highlighting that their identities or organization's names wouldn't be disclosed in the research paper without their permission to do so. Observer bias, was attempted to decrease by adopting a semi-structured interview method,



which allows the interviewee to explain in greater detail the things she, or he, saw as the most relevant ones. The discussions were recorded in each interview, which allowed the researcher to have greater focus in interpreting the discussions in the interviews. The recordings were transcribed as soon as possible after each interview to make sure that the initial interpretation of the phenomena would not be distorted in the researcher's mind.

The access to data in the field can be seen to have been rather limited since the researcher only spent around one hour with each interviewee from each organization included in the case studies, and was not able to observe the phenomena over a longer period of time. However, it was attempted that the limitation would be decreased by including topics such as organization background and their history in PM practices, as well as how the system would ideally work and probable future developments were also discussed, in the interview structure.

In addition, since the objective was to gather data from multiple organizations who had similar usage practices based on the survey findings, collecting more longitudinal case data from each organization was not seen as the ideal option. Finally, the study is also limited by the complexities and limitations of the human mind, in the sense that both the observer and interviewee have limitations in their ability to remember all relevant things, and their own cultural backgrounds and biases which might not be conscious. In attempts to avert this sort of limitations, the interview structure was sent to the interviewees beforehand so that they were able to think of the topics already before the interview.

## **4. FINDINGS**

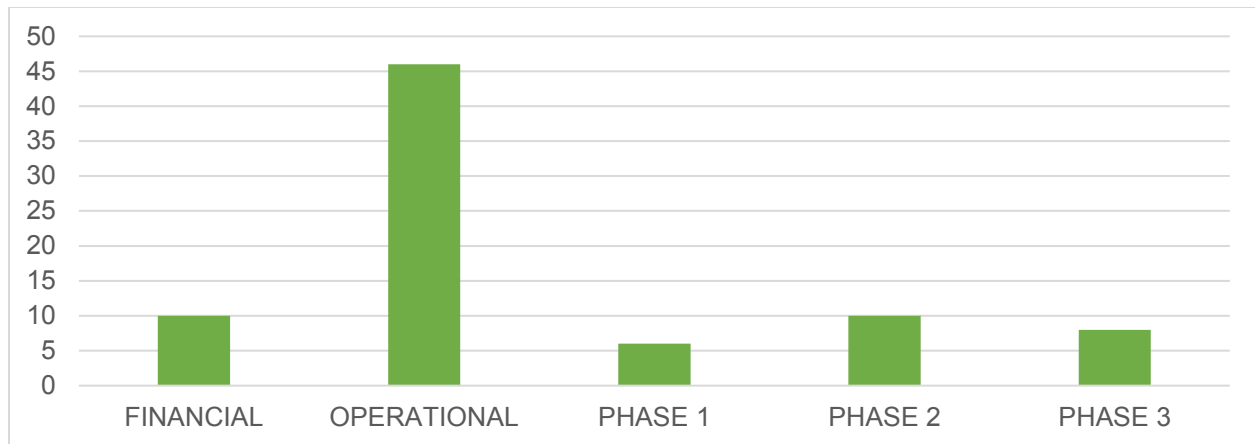
This section presents the findings gathered with the survey and multiple case study. First, some basic information of the data received with the survey is presented, after which the usage category distribution, usage purposes, and satisfaction with PM systems, are analyzed. The second part presents the findings of the multiple case study, by first presenting short case descriptions of each case, after which differences and similarities in benefits and challenges are analyzed.

### **4.1. Survey**

There were respondents to the survey from all round the world; with 38% from Europe, 25% from Africa, 15% from the Middle-East, 14% from Asia, 4% from North-America, 3% from South-America, and 1% from Oceania. The relatively high degree of responses from Africa and the Middle-East, is in part explained by these regions quite recent trend to begin the implementation of PM systems such as the Balanced Scorecard, and automatized PM systems such as QPR Metrics. Respondents' organizations varied in size when measured on number of employees and amount of revenue generated. Nearly one third (32,5%) of the respondents were from small organizations with less than 50 employees (see Appendix 3 for distribution of respondents between different sizes in number of employees). Among the respondents, both private and public sector organizations were represented, 66% of all respondents were operating in the private sector, and the remaining 34% operated in the public sector.

#### **4.1.1. Usage category distribution**

Users were categorized with the chosen framework already before conducting any interviews for the multiple case study. The outcome of the categorization was that 10 respondents were included in the 'financial' category, 46 respondents in the 'operational' category, 6 respondents in the 'Strategic 1' category, 10 respondents in 'Strategic 2' category, and 8 in 'Strategic 3'. Distribution is presented in Figure 2 below.



*Figure 2: Distribution of survey respondents between different usage categories.*

To avoid comparison of PM systems with different purposes of usage, the figure can also be analyzed by looking at the percentage between financial, operational, and strategic performance measurement systems (strategic 1-3), which are 12,5%, 57,5%, and 30%, respectively. Rather small percentage of respondents are therefore relying mostly on financial KPIs when measuring performance. Majority of all respondents are using a set of both financial, and non-financial KPIs, but have not separated their most strategic KPIs to a specific framework for strategic performance measurement, which forms the category ‘operational’. When analyzing the data, it was evident that some organizations in the operational category had more sophisticated methods than only a combination of financial and non-financial KPIs in use for PM, but the biggest threshold for these organizations for being included to any of the strategic categories, was the absence of a ‘specific framework for strategic PM’. I.e. many organizations under this category seem to use causal chains and determine strategic objectives, but have not separated these measurements into a specific scorecard.

Connections between different usage types/categories and organization size was also analyzed to see if usage practices differ between different sized organizations (see Appendix 4). The largest organizations were found from the category ‘operational’, with respondents from the strategic categories close, as the second largest. The smallest organizations were in category ‘financial’. The findings imply that small organizations are more likely to use only financial measurements for assessing performance, and that performance measurement with non-financial KPIs and with more strategic emphasis is more common among larger organizations. However, the result finds little support that it would be more difficult for large organizations to build measurements based

on strategic objectives, measure action plans, and to link strategic KPIs with incentives, since both operational and strategic categories, were on average from similar sized, large organizations.

The distribution of public sector and private sector organizations was also analyzed to see if sophisticated usage practices would be more common among either of the groups. Among the respondents, 40% in the ‘financial’ category, 28% in the ‘operational’ category, and 38% in categories ‘strategic 1-3’, were operating in the public sector. Therefore, the distribution of users from public and private sector between different usage categories didn’t show any notable trends. This implies that among the survey respondents, there seems to be no difference in sophistication of usage practices between private sector and public sector organizations.

#### 4.1.2. Usage purposes for PM systems

The survey tested purposes for PM systems based on Ittner and Larcker’s (2001) categorization of different decision-making contexts. The respondents were asked to rate the importance of six different PM system usage purposes in their organization on a Likert scale between 1-5, five representing the highest level of importance. The listed usage purposes were: reviewing financial performance, supporting planning and decision-making, driving organization’s strategy, controlling the organization’s processes, managing customer and/or supplier relationships, and reducing waste (Ittner & Larcker, 2001). The rating of the listed usage purposes among all respondents on average is presented in Table 2 below.

Usage purpose	Importance (1-5)
<i>Reviewing financial performance</i>	4,0
<i>Supporting planning and decision-making</i>	3,9
<i>Driving our organization’s strategy</i>	3,8
<i>Controlling our organization’s processes</i>	3,6
<i>Managing customer and/or supplier relationships</i>	3,5
<i>Reducing waste</i>	3,1

*Table 2: Importance of different usage purposes among survey respondents.*

The results show that the top three usage purposes for all survey respondents combined were 1) reviewing financial performance, 2) supporting planning and decision-making, and 3) driving organization’s strategy. These purposes were also rated quite closely between each other since

only point one Likert -scale points were between them. Purposes of control, customer and/or supplier management, and waste reduction, were listed as the bottom three, with reduction of waste clearly least important. Managing customer and/or supplier relationships, and reducing waste might get a lower score since the purposes are less universal and can be more tightly connected with the organizations context. On an overall level, the result indicates that although reviewing financial performance is emphasized most, purposes of planning and decision-making, and strategy implementation, are still emphasized very highly among the respondents.

#### *Importance of usage purposes among different usage categories*

The respondents' emphasis between the listed usage purposes among different usage categories was also analyzed, Figure 3 below, illustrates the prioritization of each usage purpose within the usage category. The prioritizations were calculated as residuals from the mean score for all listed usage purposes within the specific usage category. This was done to illustrate the prioritization within each category.

Usage category 'financial' rated the importance of reviewing financial performance as the most important when compared to other categories, with some use for planning and decision-making and clearly least emphasis on driving strategy. Operational category rated reviewing financial performance as the most important, and other purposes were listed as less important with more or less equal emphasis between them. When looking at the categories strategic 1-3, the emphasis changes quite clearly. The most important usage purposes among the strategic categories were supporting planning and decision-making, and driving organization's strategy. On average, the systems seem to be used for reviewing financial performance, but with clearly less emphasis when compared to 'financial' and 'operational' categories.

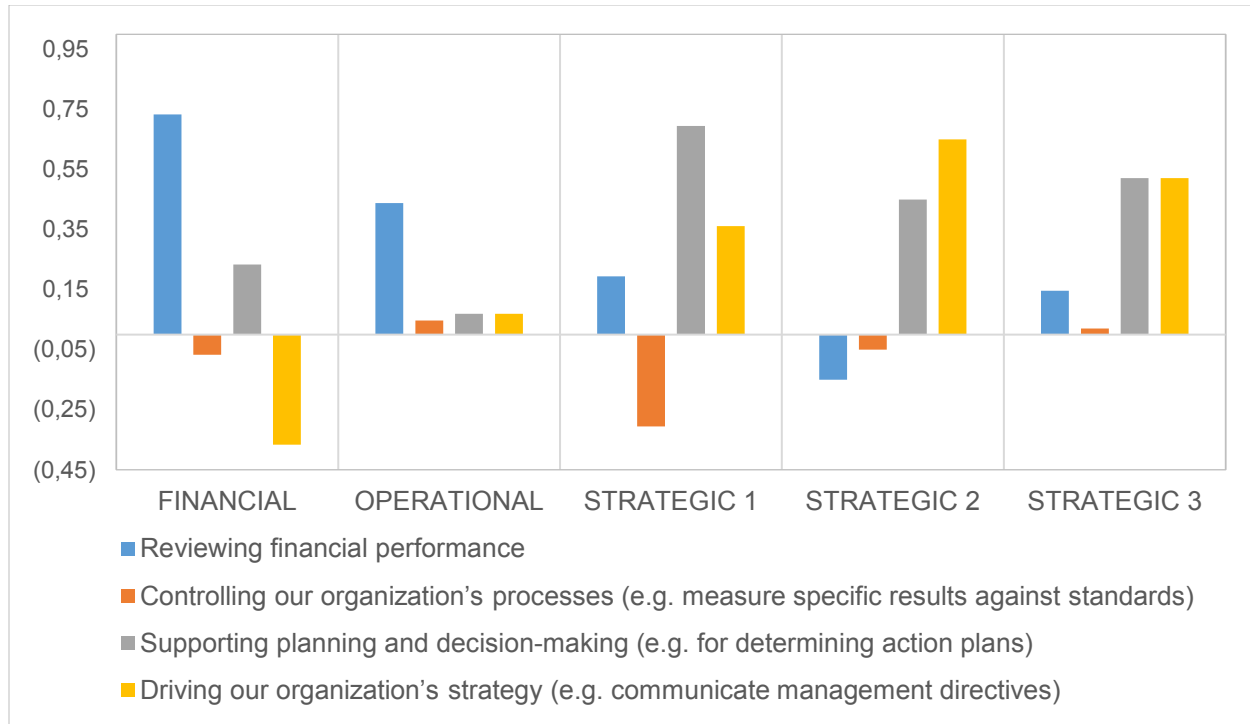


Figure 3: Prioritization of usage purposes within usage categories.

The results imply that users who mostly utilize financial KPIs in their performance measurement, place little expectations and emphasis for their PM systems to be used for strategy implementation. The emphasis between usage purposes among operational users, indicate that the most important purpose is reviewing financial performance, but also the other three purposes are prioritized above the average score between all listed usage purposes. As an interesting point, the prioritization between purposes of planning and decision-making, driving strategy, and controlling organization's processes are prioritized rather equally. This might imply a higher level of ambiguity related to respondents' ability to define and prioritize purposes for their PM systems. Respondents in strategic categories, who report using a specific framework for strategic performance measurement, emphasize the purposes of planning and decision-making and driving organization's strategy clearly above reviewing financial performance and controlling organizations processes.

#### 4.1.3. Satisfaction with PM system

The survey respondents' satisfaction with their performance measurement system was measured with three, common attributes of satisfaction: information quality, information effectiveness and overall satisfaction. The respondents were asked to rate their satisfaction with their PM system on these attributes by rating their satisfaction between 1 -7 on a Likert scale, with 1 being not at all satisfied and 7 being completely satisfied. Figure 4 illustrates the distribution of different ratings respondents gave on each attribute in total.

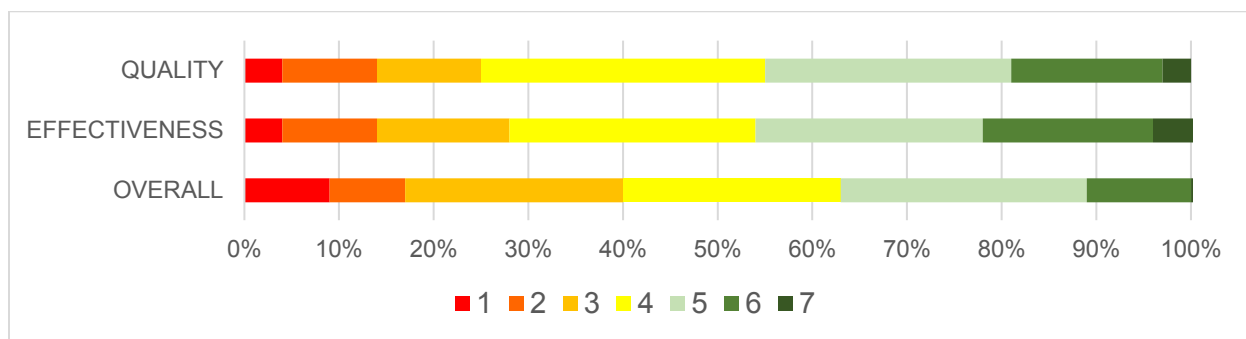


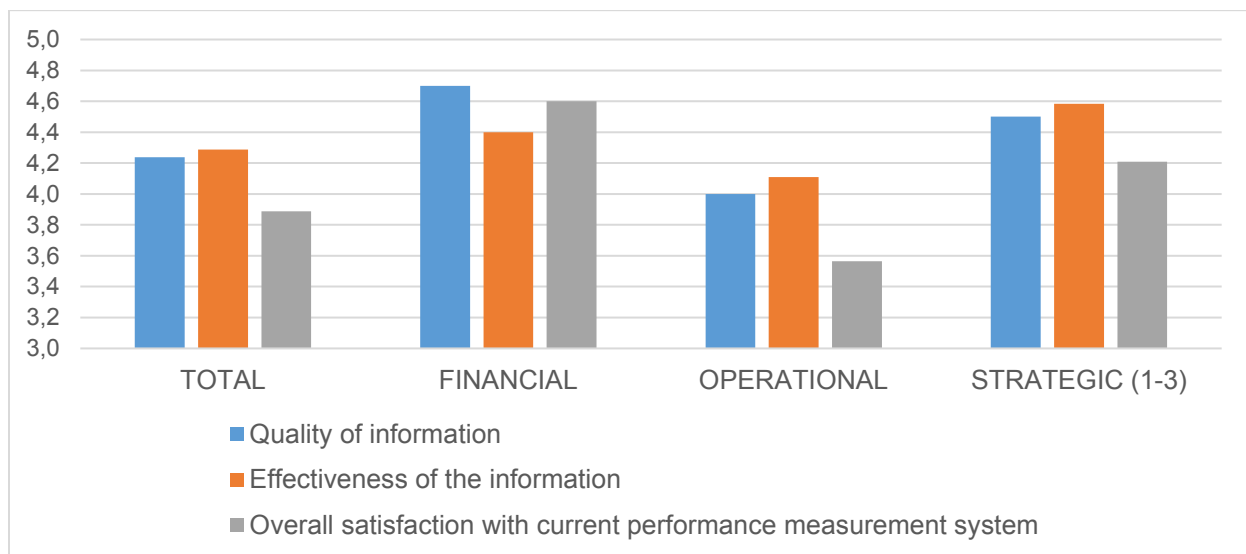
Figure 4: Satisfaction with PM system in total.

When asked about overall satisfaction with PM system, 40% of all respondents rate their satisfaction between 1 – 3, and 37% rate their satisfaction between 5 – 7, with 23% rating the neutral score 4. Although on average, the respondents would score a rather neutral satisfaction with their PM system, the distribution indicates that also a large portion of respondents rate their satisfaction below or above average. As an interesting observation, none of the 80 respondents rated 7, ‘completely satisfied’ with PM system, on an overall level.

Distribution between the respondents' ratings seems rather similar when asked about the ‘quality of information obtained from PM system’, and ‘information effectiveness’ in the organization. In addition, both attributes were scored higher than overall satisfaction, with roughly 45% of all respondents rating 5 or higher. I.e. the respondents are more satisfied with information quality and effectiveness compared to satisfaction with PM system on an overall level, indicating that other factors than information quality or effectiveness are affecting the lower overall satisfaction.

### *Usage category and PM system satisfaction*

Satisfaction with information quality, effectiveness and overall satisfaction with PM system was also analyzed between different usage categories. For comparing satisfaction between different user categories, the mean value for each attribute within the categories was calculated. Figure 5 illustrates the mean values that all respondents gave; in total, financial category, operational category, and in strategic categories combined.



*Figure 5: Satisfaction with PM system between usage categories.*

When looking at the ratings among the different usage categories, it seems that the satisfaction has variation. Users in the financial usage category rate their satisfaction highest among the different categories on all three attributes. As an interesting observation, satisfaction with data quality is rated lower than satisfaction with information effectiveness in all categories, except financial. Also, in all other categories, the overall satisfaction with PM system was rated below data quality and information effectiveness. The observation supports that financial KPIs seem to have a high degree of data quality and reliability (Ijiri, 1975). In addition, since the category rates overall satisfaction above satisfaction with information effectiveness, the implication might be that the information is not expected to convert into action as effectively as among the other categories.

Further, the clear focus on reviewing financial performance, reported by users in the financial category, supports the implication that the category has less use for their PM systems for decision-



making and planning. The clearly prioritized focus might also explain some of the relatively high degree of satisfaction in financial category when compared to other categories.

The respondents in category ‘operational’ rated their satisfaction lower than other categories on every attribute measured. Furthermore, when measured on overall satisfaction with PM system, the category reported point three Likert -scale points lower than the average overall satisfaction of all respondents. This observation is rather alarming since the category represents the majority of the survey respondents (57,5%).

In the strategic categories, users rated their satisfaction clearly higher than among operational category, and higher than the averages for all respondents in total. When compared to the high satisfaction levels reported in financial category, strategic category rates the ‘effectiveness of information’ higher. The reported data quality is at a relatively high level also even when compared to the financial category. When taken into consideration that the strategic categories all reported a high focus on decision-making and planning, and driving strategy, they are likely to have high expectations from their PM system to convert information into action. The high satisfaction observed in information effectiveness, information quality, and overall satisfaction, gives support for the implication that more sophisticated or strategic usage practices lead to more effective PM systems and higher satisfaction (Speckbacher et al., 2003).

#### *Support from PM system*

As described in the data collection –section of the study, the satisfaction with current PM system was also measured in the survey by asking the respondents to rate the support they have received from their PM system in achieving a set of performance goals that were presented in the survey. Respondents were asked to rate the support their PM system had given them for reaching each goal, between 1-5 Likert scale, with 5 representing highest degree of support. The list of performance measurement goals was adapted from Speckbacher et al’s (2003) study, who had chosen the benefits by reviewing BSC literature.

The tested benefits were: 1) developing strategy (further), 2) clarifying and communicating strategy, 3) improving alignment of strategic objectives with actions, 4) strengthening the consideration of non-financial drivers of performance, 5) improving financial performance, 6) improving strategic learning (control and feedback), 7) building up a base for an incentive system, 8) increasing the consideration of stakeholders, 9) identifying business process re-engineering opportunities, and 10) enhancing the investments in intangibles.

From the ten different benefits tested with the survey, four benefits got clearly less points than others: identifying business process re-engineering opportunities, increasing the consideration of stakeholders, building up a base for an incentive system, and enhancing the investments in intangibles. To make comparison between the usage categories simpler, the above-mentioned benefits are left out of the analysis. Figure 6 presents the level of support respondents rated on average among the different categories for the six highest scored performance measurement benefits on an absolute scale.



Figure 6: Support from PM system in achieving performance goals.

The users in financial category seem to be more selective than the other categories, since on average, they clearly have received the most support from their PM system in improving financial performance, improving alignment of strategic objectives with actions, and developing strategy

further. The high degree of support from the PM system in improving financial performance can be expected in light of the usage purposes and satisfaction reported by the category. Further, the relatively high score of support on developing strategy and improving alignment, in comparison to the support on reviewing financial performance, is rather surprising, but is however lower when compared to the other more strategic categories.

Users in operational category and strategic categories report receiving support more widely across all the listed benefits. Strategic categories however report receiving a higher degree of support when compared to operational category on all listed benefits, and when compared to financial category on all listed benefits except for 'improving financial performance'. This implies that strategic, and more sophisticated usage practices are generating benefits for their users more, and on a wider spectrum, than for users who have less sophisticated usage practices when measured with the listed benefits. However, it needs to be highlighted that the list presented to the respondents included benefits most commonly related to the use of SPMSs, particularly the BSC. When looking at specific benefits or PM goals, an interesting observation is that improving financial performance is rated almost as highly among strategic categories, as among the financial category. The benefits that seem to increase most when moving from financial measurement towards strategic measurement are, clarifying and communicating strategy, strengthening the consideration of non-financial drivers of performance, and improving strategic learning.

#### 4.1.4. Summary of survey findings

The division of survey respondents according to the earlier developed framework resulted in a distribution where 12,5% were included in 'financial' category, 57,5% in 'operational', and 30% in 'strategic' category. Therefore, operational category formed the majority of all survey respondents. It was also observed that among the users in operational category, some had quite sophisticated usage practices in use, and that the most crucial threshold for a respondent to proceed to any of the strategic categories was the absence of a 'specific framework for strategic performance measurement', which has been called for in many of the definitions of an SPMS (Speckbacher et al., 2003; Ittner et al., 2003; Chenhall, 2005).

When presented with different decision-making contexts to analyze different usage purposes (Ittner & Larcker, 2001), the respondents rated reviewing financial performance, supporting planning and decision-making, and driving our organization's strategy as the most important. Analysis of the differences in usage purposes between the usage categories showed that financial category prioritizes using the system for reviewing financial performance clearly above other listed purposes. Operational category rated the importance of reviewing financial performance as the highest as well, but placed above average importance on other listed usage purposes as well. The reported purposes changed quite clearly among the strategic categories, who clearly emphasize using their PM system to support planning and decision-making and driving the organization's strategy. In addition, in the operational category, the purposes were emphasized rather equally, implying the least amount of focus between the categories.

Overall satisfaction with PM system among all survey respondents was on a relatively neutral level, however with quite many respondents reporting above, or below average satisfaction when analyzed as a distribution. Usage category financial rated highest overall satisfaction with their PM system, and operational category was the least satisfied category. The relatively low satisfaction of users from the operational category was rather alarming since they also formed the largest group among the survey respondents in total. Information effectiveness was on the other hand, scored highest on an absolute scale by the strategic categories, implying that more strategic or sophisticated usage practices lead to more effective performance management. Also, the above average satisfaction observed in information quality and overall satisfaction, gives support for the implication that more sophisticated, or strategic, usage practices lead to more effective PM systems and higher satisfaction.

When analyzing what sort of benefits PM systems have supported the respondents with, it seems that financial category was again more selective and had mostly benefitted from PM by improving financial performance. The support on different benefits in operational and strategic groups was more widely distributed among all listed benefits. Users in strategic category, however reported receiving more support on all listed benefits on an absolute scale when compared to operational category. Strategic category also rated receiving higher support than financial category on all listed benefits, and both scored nearly equal support in improving financial performance.

The observations made above also highlight the importance of studying the usage practices of users in operational category in more detail. Operational category formed the largest group among all survey respondents, they had most variation between the tested usage practices, and didn't report using a specific framework for strategic performance measurement. When analyzing usage purposes, the category showed least prioritization, implying lower level of focus and clarity of PM objectives. Furthermore, the category also rated lowest on satisfaction when measured on satisfaction with information quality, information effectiveness, and overall satisfaction with current PM system.

## **4.2. Multiple case study**

As described in the earlier sections of the study, the multiple case studies were targeted towards users who in the survey analysis were in the operational category. In addition, the cases were chosen from organizations who are as different between each other as possible. All interviews were conducted with the same person who had originally taken the survey. The case studies aim to gather more understanding about the context of performance measurement conducted in the case organizations and to learn what sort of benefits and challenges the respondents view that they have with their PM system and why.

The cases presented are a small/medium sized manufacturing company, supplier management at a large global manufacturing company, a university of technology, a large public company in travel and transportation industry, and a Finnish business unit of a multinational construction company. Each case will next be presented by presenting the organization's background information, usage purposes for performance measurement, benefits and challenges with performance measurement, and reasons behind them. After the presentations on each case, similarities in benefits and challenges are analyzed in a separate section.

#### 4.2.1. CASE 1: Manufacture of logistics machinery

<i>Industry:</i>	Manufacturing
<i>Private / Public:</i>	Private
<i>Revenue (2015):</i>	Below 50 MUSD
<i>Employees (2015):</i>	Less than 50 employees
<i>Interviewee's role in organization:</i>	Production Manager
<i>Location:</i>	Finland

The company was founded originally in 1992, and is currently focused on automatized production of components serving the logistics industry. At the moment, the company has three business areas: automatized component production, pilot or prototype manufacturing for customers, and manufacture of components for paper processing machinery. All three different business areas are located in the same facility in Finland.

The reporting structure has three levels: strategic, tactical, and operational. Strategic level includes company management, where strategy is in the focus, tactical level is focused on production planning and optimization, and operational level refers to shop floor workers. Each level has its own defined KPIs, where the strategic level utilizes more financial and strategic metrics of performance. Tactical level utilizes metrics to support planning the production and workflow in order to meet delivery deadlines. Operational KPIs have more to do with daily production, such as quality, and cleanliness of the production facilities.

The strategic level measurement set has roughly 10 KPIs, of which most of them are combined from the tactical level KPIs. The tactical level also has roughly 10 KPIs for each of the three business areas. KPIs for each business area are the same, but are combined on the strategic level. Operational shop-floor level has roughly five KPIs in use. Timely usage of these can be divided so that the strategic level measures are reviewed on a monthly basis, tactical measures are reviewed on a weekly basis, and operational measures are used on a daily, or even hourly basis. In addition to this timely division, the management level has weekly meetings where also all these performance indicators are discussed if needed, and key areas are communicated with the KPIs in the meetings.

The current performance measurement system is embedded in the organization's ERP system. The system is rather new, and it's been operational since the fall of 2015. The main purpose of the system is to support decision-making rather than to control the organization. An important purpose of the measurement is also to increase the ability to recognize areas where the case company is especially good at, and could therefore have a competitive advantage.

The interviewee is the production manager of their automatized component production business area. His role in relation to the performance measurement system is such that he has been involved in designing the measurement system from the strategic level all the way to the operational level. Currently, he is involved in developing the system on ad-hoc basis whenever it is needed. In daily work the interviewee's usage of the system is related to the tactical level measurement that supports the planning and management of the production in his business area.

#### *Benefits of performance measurement*

As a general note, the benefits that the company has been able to get have a lot to do with having more information about the operational things that the organization is doing, rather than only overall financial KPIs. A great benefit from performance measurement system has been that it has enabled the company to react faster and to correct things. As the biggest enabler of this, the interviewee sees the transition from measuring only financial or too general KPIs into measurement of actual operational performance. A key success factor behind this benefit is the ability to track shop floor activity more closely and to get information about daily work. The interviewee described it as follows:

*"Our main benefits comes from the ability to react faster and even possibly to the right things. If some measures are on a too general level, they don't reveal the problems that well and decision-making is difficult. A big change has been the transition from overall measures and financial measures to the measurement of actual operations and activities."*

On top of this, as an enabler of better and faster decision-making, the interviewee mentioned that now they have a rather simple set of KPIs in use, which has helped in keeping focus on the most important things. The new ERP based performance measurement system has also made the organization's operations and performance more visible and transparent for the system's users and managers. The visibility also makes it more automatic that managers focus on improving

performance, as the KPIs are made visible on a daily basis in the beginning screen of the ERP system:

*“It’s mostly coming down to having that performance data automatically on your screen every day. It’s a totally different thing than having them in some folder and excel files that the managers would need to each time go to and click open.”*

### *Challenges with performance measurement*

The organization’s aim is to increase the role of measurement in the future. The focus area in this would be to increase the amount of operational performance measurement, as this is where most of current benefits have been realized so far, and with more data about operations, the interviewee sees that more potential would be gotten out of the system. Therefore, many of the challenges with current performance measurement system have to do with creating new KPIs and expanding the level of shop-floor measurement without adding the shop-floor workload.

Main challenges in using the current PM system were related to data gathering and combining data from different sources when developing new KPIs. There were cases where the data that would be needed in order to form a KPI didn’t exist or it is not gathered, and cases where the data is there but combining it into one KPI is not sensible. The combination of data was also difficult in cases where the data would need to be combined from different IT systems, which may not be possible. The interviewee described the challenge as follows:

*“The greatest challenge with developing the system usually has to do with us not having the data for what we want to measure. Or another example is that the KPIs structure makes the data difficult to collect and combine from our information systems – and immediately when a KPI is for example split into two parts, it is a lot more difficult to understand what direction the KPI is then pointing at (as a whole).”*

A key challenge in developing new operational KPIs is also ensuring that the data behind it is correct, from usage perspective it is difficult to adopt new measures when there is no historical data about performance in that area. This had made setting target values more challenging.

Enhancing the ability to do drill downs in the PM system is also one challenge listed, as the interviewee describes it:

*“Understanding the weak spots would require more – as long as things are running smoothly its good but when some measurement turns ‘red’ it’s more difficult to find the reasons behind it”.*



Key things behind these challenges have to do with the IT system's ability to combine information. Also as the focus would be to get more data from the shop floor level, data gathering is a key challenge that the case company is working on:

*"It's about data gathering in relation to a person's work effort, we don't want our shop floor workers using their time in learning how to use the reporting tools and filling out information about performance, we want them to keep the production machinery running and making sure that required amount of output is produced."*

#### **4.2.2. CASE 2: Managing global transportation at Metso Oyj – Supplier Scorecard**

<i>Industry:</i>	Manufacturing
<i>Private / Public</i>	Private
<i>Revenue (2015):</i>	Over 1000 MUSD
<i>Employees (2015):</i>	Over 5000 employees
<i>Interviewee's role in organization:</i>	Global Transportation Manager in Air and Ocean Transportation
<i>Location:</i>	Denmark

The company is a Finnish manufacturer, serving the mining, aggregates, recycling, oil, gas, pulp, paper and process industries. The company's products range from mining and aggregates processing equipment and systems to industrial valves and controls, and they have over 80 service centers globally. The company has three market areas / business segments 1) flow control, 2) mining capital business area, 3) flow control business area. The interviewee is a specialist, and the manager of air and ocean transportation, and he is located in Denmark. He is managing a total of 80-90 units around the world, with around 2500 active sub suppliers, with suppliers ranging from major manufacturers to very small suppliers of 'nuts and bolts'.

Different units around the world usually have their own logistics person assigned. The units' logistics people are responsible for the daily operation of logistics and the interviewee is focused on the commercial side of logistics, towards suppliers, with more emphasis on supplier agreements negotiations, and supplier performance measurement and -performance management. The performance measurement system used to manage the transportation is based on a supplier scorecard. The scorecard is used on a quarterly basis as part of quarterly business reviews on

supplier performance. The scorecard has a total of 24 KPIs, which are divided into six different categories: 1) operational performance, 2) visibility/logistic performance, 3) operational innovation, 4) pricing management, 5) contract management/global collaboration, and 6) account management/local collaboration. Each category has four measurable KPIs. The outcome on each of the 24 KPIs is converted into a score. Some of the thresholds for conversion of an outcome into a score exist already in the contracts and definitions for the KPIs, but the actual scoring of the KPIs is done in quarterly meetings with the provider. In other words, part of the scores given, are discussed together with providers.

### *Benefits of performance measurement*

The interviewee described three different benefits that have followed from using the PM system. First point that came to the attention was that discussions had and decisions made, have become fact-based. The interviewee reflects that the system is enabling them to make decisions based on facts rather than feeling, he illustrates the problem by pointing out that for transportation it is not easy to say whether it's a product or a service. This can lead to situations where the decision-maker is making decisions on supplier selection based on a feeling basis:

*“For transportation, it should be very simple to define the KPIs and say that these are the factors of moving goods from A to B in this time frame. But a lot of people are depending on things like ‘well I like this person better, he does things better, but I can’t really say what it is’. When I have to ensure that the transportation we have is the cheapest, I’m always against people saying ‘well, I like this better’.”*

The PM system has had an integral role and purpose in creating fact based information to make decisions on supplier selection in the case organization, as the interviewee describes it:

*“The reason why we have performance measurement is that people are being instructed around the world to use different suppliers and if they don’t use them, they could have good arguments for it, but majority of the time it is really coming down to a feeling issue. And the reason why we have performance measurement is to say ‘well these are the agreed facts that we look at, and if you don’t like it, and if they don’t reflect your feelings – then you must challenge our system’. What we avoid is that people can make decisions that are against the overall measurement system and using for instance other suppliers that we don’t have an agreement with.”*

The interviewee also pointed out that discussions and decisions on suppliers have become more informed in the sense that is possible to take into account corrective actions taken by the suppliers. In case there are deviations in performance for a supplier, the performance is discussed together

with the supplier in quarterly business reviews. The interviewee describes this as a good forum to take these factors into account, and also to make sure that suppliers have a similar understanding on the KPIs in which they are measured:

*“Sometimes there can be very good arguments on why something is not the way it’s supposed to be – maybe we also have problems on our side and are causing it, or the supplier has already done corrective actions ... the purpose of this is to give fact based feedback to each provider and to ensure that there are clearly defined KPIs and clearly measurable KPIs”.*

The second benefit from using the PM system raised from the first benefit, as better terms with suppliers. As the case organization is able to better make fact based decisions, it has also unified the company’s supplier selection processes. When more people are using pre-negotiated contracts with suppliers, they have been able to increase their’ contract compliance, which is an important driver also for suppliers to negotiate good contracts with the case organization. The interviewee described this as follows:

*“When I joined (the case company) they had a contract compliance of 35% in air and ocean transportation – meaning that even if we had global agreements, only 35% of our shipments around the world were used against those global agreements. Even though that they were cheaper, even though they were supposedly better, people had a philosophy that ‘this company does not give the same service’. With the PM for specific KPIs and with the adoption of a scorecard, and the transparency where we share this information around the world, we have moved from having a contract compliance of 35% to now having 90% of our shipments being moved under the global contracts. Which is extremely high percentage for an industrial company of our size.”*

The third benefit discussed was that the interviewee saw the PM system helping them to gain efficiency by learning and sharing best practices. As a good example of this, the interviewee mentioned in the previous quote that the increased contract compliance is partially result of increased transparency since information on supplier information is shared around the world. As another example, the interviewee mentioned that they have been able to streamline their invoice approval process by developing information systems in the business units.

### *Challenges with performance measurement*

When discussing about key challenges with the PM system, two key challenges related to the use of the PM system were listed by the interviewee. Firstly, there was a challenge with data quality,

and second with finding ways for measuring people. The data quality is decreased mainly for two reasons according to the interviewee; lack of standards and amount of complexity in supply chain. The standards that are agreed upon for each contract with a specific supplier are company/contract specific and not universal standards. This is making it difficult for the supplier to actually be able to measure their own performance based on the same criteria and to make sure they are delivering according to the contracts. As the interviewee describes it:

*“The standard is created when the contract is made with the supplier. The headache in this is that the supplier can say to me that they will deliver according to my standard or our requirement – but in reality, they are not able to track that since they have their own set of KPIs and things to optimize.”*

The amount of complexity in supply chain was also related to lack of standards. This is creating challenges with measurement and data quality. To quantify things, standards need to be invented, which can make things complicated, and there are no international standards for codifying the variables in the supply chain, making it difficult for the supplier as well:

*“The complexity is huge, which is not a problem in itself, but creates a problem for data quality. When we think of our PM system, our PM system requires a standard – a standard which we don’t have and we cannot go anywhere. We are inventing the standard with the suppliers and that is a process I’m not too happy with.”*

As the second major challenge, the interviewee pointed out the difficulty of *finding ways to measure people*. The challenge was related with determining target points and thresholds for KPIs, and with constant development of the PM system. The interviewee described the challenge in using the system so that the KPIs and the PM system would reflect how to feel about performance:

*“I’m trying to find ways of measuring people. With more operational things, how do we link KPIs with the daily feeling – I’d like to get it work that way. Would be nice if you could take a scorecard and you try to adapt it so that it matches how people feel. I understand that you get agitated if you’re flight is delayed – but when should you get the most agitated? When it’s 5 minutes late or when its 5 hours late? Where is the threshold and what is the feeling of it? When do we deserve to be feeling that this is not good? ...So it’s simply improving your KPIs constantly.”*

#### 4.2.3. CASE 3: Managing a university of technology

<i>Industry:</i>	Education
<i>Private / Public:</i>	Public
<i>Revenue (2015):</i>	Below 50 MUSD
<i>Employees (2015):</i>	2000 - 4999 employees
<i>Interviewee's role in organization:</i>	Senior officer
<i>Location:</i>	Lithuania

The case organization is a state owned, public university of technology, located in Lithuania. The university is quite a large institution, with 2000 employees working in the academic faculties and other staff, and with approximately 10 000 students. The interviewee is a lecturer and works also in the administration of the university as a senior officer. Through the position and responsibilities in the administration of the organization, he is also working very closely with the organization's performance measurement system. The interviewee is part of a division/center, or an 'office of strategy management' in the university, that is responsible for strategic planning, target setting, performance, and quality management.

The university's management has roughly three levels: 1) university level 2) faculty level and 3) department level. The university has three main processes/main strategic objectives: studies/education, research, and impact for society. Being a public university, the organization's management has many legal obligations from the government. They are obliged to provide stakeholders with strategic plans, target points for the future and with some key performance indicators as well. In this sense, having some sort of PM system in place is needed to fulfill the requirements by legislation. The performance measurement system in its current shape is quite new to the organization and it has been developed as part of a quality system project, which had begun in 2013. The elements of improvement in that project were processes, KPIs, and documentation. The project also included KPI re-definition, and eliminating KPIs that are not needed.

The measurement and reporting structure follows the three managerial levels – where strategic planning and monitoring is done on the university and on the faculty levels. University level being more concerned to the long term strategic performance and faculties providing data from departments on the performance. The faculties are responsible for providing information from the

departmental level to the university level (more of an operational measurement and monitoring). The faculty management also makes annual strategic plans and annual action plans which are cascaded to the departments, who are in the end implementing the initiatives.

The primary purpose of the PM system according to the interviewee is to be able to store and to see exact information on how they are performing in a timely manner. Another reason is to have the data about performance in one place. However, ultimately the primary purpose of the PM system is to enable the organization to get information to fulfill their strategic targets relating to research, education, and stakeholder impact.

### *Benefits of performance measurement*

The interviewee mentions that the biggest benefit acquired from the PM system has come through the learning process they've had to go through already in the implementation phase – so as a bigger theme, learning about how the organization's processes has been an integral benefit. The benefits partly following from this learning process, were 1) decreased number of KPIs, 2) ability to discuss internally about performance, 3) ability to argument things internally and towards external stakeholders. The interviewee also saw that they've benefitted from having all performance data in one place, and from being able to benchmark performance against similar organizations.

As part of the quality management project, the organization needed to determine all processes, define what are their main tasks are, and choose or determine the KPIs that would be used. Different divisions and people had their own requirements for KPIs and wanted to include their number to the organization's PM system. The interviewee described this process as follows:

*“It was quite a work to reduce the number of KPIs – and to make it more systematic – and quite a lot of work to define the main processes and main tasks.”*

The development work resulted in a learning process throughout the organization, and the PM system is now much more logical and includes less KPIs to make it more understandable. Also the process has included people from all levels of the organization, so all levels have benefited from this and now have a better understanding of key processes:

*“It is now much easier for us to understand the performance and also for others to understand, it is easier now also to go to for example to the ministry of education. Understanding has increased in many levels, in the university level, faculty level and on societal level.”*

The logical structure and understanding of different processes and their’ interrelations had also enabled the organization to have more genuine discussions internally about performance – time is used more efficiently when more people understand the background factors that are affecting performance, resulting in more informed decisions:

*“We are trying to go deeper in understanding and dealing with information from the data – it is not only statistical information. Not only looking at the raw data or one KPI or statistic by itself – we wanted to have a logical structure...”*

On top of being able to make deeper analysis on things behind performance, the understanding of processes and KPIs had also helped in argumentation of things internally and to external stakeholders. As an example of this, the interviewee described the change as follows:

*“If it would be possible to make some screenshots of some meetings of the top managers a few years ago and nowadays – it’s a totally different picture. I like the changes I see because now I see much more rational discussions. And they are based on the indicators, they are based on the statistical information much more than on someone’s opinion or someone’s understanding.”*

Finally, having a better, more logical, and standardized KPIs, has enabled the university to benchmark their’ performance against similar organizations:

*“As I mentioned that learning exercise which was provided by the (Quality management system) project and by the measurement system, and the strengthening and fulfilling of that measurement system, resulted in better understanding and made it possible to see a clearer picture (of our processes). We realize that we are not a very exceptional organization in a sense, and in terms of the possibility to benchmark ourselves against some other universities we get benefits. Sometimes the KPIs might not be exact same but still sometimes we are quite similar and its possible to compare and to track your competitiveness.”*

### *Challenges with performance measurement*

As stated earlier, the PM system in the case organization is currently still in its development phase. Although many benefits are already realizing – the hard work in defining all processes and KPIs is still ongoing, and the reported challenges related to PM system usage are mostly linked to developing the system further. The interviewee mentioned their’ awareness that development is likely not to stop at any point and that a big portion of the challenges being ‘natural challenges’

which rise from challenging themselves – learning more, adapting, and making the structure/KPIs better based on new information.

The challenge with determining different processes and getting a clear picture of what processes are contributing and what not was also brought up. This challenge is both in the organization and also in the systems. These tasks include determining processes and making them measurable and making sure that the Software used for PM, is utilized in the measurement. He finds it sometimes problematic to map all organizational processes and to reflect that in the reporting structure of the PM system.

#### **4.2.4. CASE 4: Public company in travel and transportation**

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<i>Industry:</i>	Travel & Transportation
<i>Private / Public:</i>	Public
<i>Revenue (2015):</i>	Over 1000 MUSD
<i>Employees (2015):</i>	Over 5000 employees
<i>Interviewee's role in organization:</i>	Director
<i>Location:</i>	Finland

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The organization is a Finnish organization operating in the public sector, in logistics and transportation industry. The organization's main business lines are: mailing services, packaging- and logistics services, and joint services production. The joint services production is a function that offers different infrastructure, processes, and services to both mailing services, and packaging- and logistics services – providing all shared resources needed (e.g. distribution and terminals). The interviewee is working in the group finance function, her team is taking care of reporting to the management and the board of directors on performance on different KPIs. They validate the data and collect it from the different business lines, form them into the set of KPIs that the management is interested about, and make reporting packages on a monthly, and on a quarterly basis. The interviewee described that their focus is on the yearly objectives and on forward-looking planning and ensuring that the organization is moving towards its targets. Through these responsibilities, it is the interviewee's team who is responsible for the PM system's operation.



The organization has recently gone through a project of KPI definition, standardization and unification project. The project was completed before the year 2015 and year 2016, was seen as the first stable year with the current format. The project's aim was to decrease the amount of different KPIs used with critical analysis on each KPIs' contribution to the management level scorecard. The project also aimed at finding economies of scale by standardizing KPIs so that same KPIs would be used through the organization when possible. Also, master data was updated so that when talking about the same thing, the headline would also be the same. One aim was also to improve the visualization of KPIs and combining KPIs into the same dashboard –like view for different levels. This project essentially attempted to simplify the structure and amount of KPIs, which had resulted from silo thinking in the organization, a “cleaning the table” – as the interviewee described it. The framework used as a basis for the PM system was the balanced scorecard – with top level scorecard consisting of KPIs in four areas: people, sales, costs, and quality. The top management level scorecard contains around 30 different KPIs organized into the different categories.

Each business line also has its own scorecard and business line manager also has a personal scorecard which includes the top level critical measurable KPIs that act as a base for the incentive system. The top-level scorecard objectives and KPIs are converted into other KPIs for the business line level – for example EBIT objective/KPI is converted into cost measurements and delivery accuracy measurements. From the business line level, the KPIs are further cascaded down by the business units who determine their most relevant KPIs and their contribution to each business line level objective. Between the top-level scorecard and the scorecards of different business line managers and support functions, the interviewee estimates that they have roughly 100 KPIs in use – and states that ideally they would still need to have significantly less. The organization doesn't have professional software in use for performance measurement – the measurement and reports are mostly done through spreadsheets, which the interviewee saw problematic.

### *Benefits of performance measurement*

The interviewee listed roughly four different kinds of benefits from the PM system that she has seen in her organization. Firstly, the PM system has supported decision-making and finding root

causes for operational problems. Second, the reaction time to problems has decreased a lot, corrective measures are taken more rapidly. Thirdly, the quality of management has improved in some parts of the organization. The last topic was that also sharing the information and learning has increased.

The PM system in its current format has already made it easier for the organization to find root causes for problems. The interviewee described this as follows:

*“We can make conclusions out of the data – if for example EBIT is low on the top-level scorecard, we can see if the production quality has been the reason or do we need more human resources.”*

In other words, they can find the reasons and critical points that are affecting performance at the top level. As a key enabler of this benefit, the interviewee saw the causally linked measurements but also the fact that they are better able to analyze the whole logistics chain – ability to track and compare performance of units in different geographical locations with the same measurements:

*“Sometimes the problem can be very local, for example a large unit is a critical point in the logistics chain, if there are measurements showing ‘red’, and other units nearby are in the ‘red – zone’ – we are able to analyze which point in the logistics chain requires attention. In this purpose, the PM system has really worked well.”*

The second benefit was that the organization has also been able to decrease the time it takes to take corrective actions if some KPIs are in ‘the red zone’. I.e. the information gained from the PM system is converting well into concrete corrective actions and development projects. As an enabling factor, the interviewee mentioned the systematic approach that the management has in reacting to problems:

*“If we see that some measurement area is in the red zone from month to month, we prepare a ‘checklist’ of things to correct in that unit, that specifies the things that require more attention... ...It’s a different thing how people learn and take on the initiatives. This is done systematically, and when we work systematically, the whole system works better. If we sometimes react immediately to problems and sometimes we let some things go for a while, it creates randomness and confusion.”*

A final point enabling the faster reaction time is that managers on all the levels have learned how to use the PM system and to see how its dimensions are linked. The scorecards for business lines and units contain KPIs from the same four dimensions as do the top level scorecard, which helps in structuring cause-and-effect relations between processes. Learning in itself, can also be listed here as a benefit arising from using the PM system, but when it’s supporting the reaction times, the interviewee described it as follows:

*“The structure of the measurement set has also been learned in the lower levels of management. When we have a similar structure in the measurements on different levels, it is easier to start combining things, and looking for cause-and-effect relations to see root causes.”*

The third benefit reported by the interviewee was partially linked to the fact that people have learned how to use the new measurement / KPI structure. According to the interviewee, the quality of management had started to develop in some parts of the organization. At the time of the interview, it was the first stable year for the new and clarified system, and managers who had learned the way it works and the way in which the KPIs are tied to each other, can be better managers. The interviewee saw that managers are able to lead based on the KPIs rather than based on the feeling of things. She described the development of managers work:

*“Management has started to develop in some parts of the organization. They now have had the ability to manage through the KPIs, and to focus on limiting their analysis to the most critical points. ...When we have been able to find the right KPIs that are linked to each other, managers are able to take a more holistic view of the problems.”*

As the final benefit, the interviewee saw that the PM system has enabled learning and sharing of information in the organization. The business line managers / executive level managers have meetings with each other on a monthly basis where they go through each manager's business line's scorecard. The KPIs are discussed and the meeting is an opportunity to learn from others as well. In addition to the systematic meetings, the interviewee saw that a common language across different functions was integral for this. The recent project of KPI re-definition created a more standardized language when talking about different KPIs.

### *Challenges with performance measurement*

The interviewee listed challenges that were in many parts linked to each other. She reported roughly three kinds of challenges that were related to 1) the IT systems and the lack of a BI tool, 2) ability to react to problems fast enough, and 3) communication and transparency. On top of these, a key challenge affecting the clarity of the PM system was the quite heavy amount of different KPIs used in the organization, which is also decreasing the clarity of PM system as a whole. The interviewee described the problem that technology and large amount of KPIs is bringing as follows:

*“There are a lot of measurements. It is not possible to focus on ten things at the same time, but we should find certain key areas to focus, deal with them one at a time, and move onto the next things. This sort of development for the PM system is now in discussions, and the next step is to*

*start analyzing what sort of cause-and-effect relationships there are between the KPIs. Currently the amount of KPIs is hindering the visibility of these relationships, which decreases our reaction time.”*

Challenges with the IT system resulted in a lot of manual work that needed to be done every month to collect, combine and validate the data. This had made also the reaction time to problems longer since the data requires a lot of processing before reporting. Although the interviewee saw that the PM system’s strengths are in enabling faster reactions to problems, it is also an area that can be improved a lot. From the lack of automation and BI tool, it also follows that the communication of the KPIs and reporting to different levels of the organization was not efficient and was decreasing the benefits related to transparency, communication, and learning.

#### **4.2.5. CASE 5: Three views on PM in a construction company**

<i>Industry:</i>	Construction and project development
<i>Private / Public:</i>	Private
<i>Revenue (2015):</i>	500 - 999 MUSD
<i>Employees (2015):</i>	2000 employees
<i>Location:</i>	Finland

The case descriptions presented in this section are all comprised based on interviews in the same case company. In total, three interviews were conducted in the organization. All people interviewed were managers in their functions and had their own set of performance measurement practices and systems in place for performance management. The cases are illustrated so that first the company basic information and management system in the top level are presented as common background information for all three sub-cases. After these, the benefits and challenges are discussed commonly by combining observations from the three interviews.

The case organization is the Finnish subsidiary of a multinational construction company. In 2015, the company has approximately 48 500 employees and generated a revenue of 16,5 billion euros. The operations in Finland employed approx. 2000 people. The company’s operations in Finland cover construction services, residential and commercial project development and infrastructure development. The strategy of the case company is determined by the group -level management.

The main tool for the group level and for the Finnish business unit (BU) -level to track the performance of their organization is a BU -level strategy document / scorecard, which is the highest-level scorecard for strategic objectives in the business unit. Strategically important areas are included in the BU level scorecard and tracked quarterly. Each area has different KPIs and statements for strategic targets in the BU level scorecard. The scorecard also includes KPIs that are changing over different periods or which are only tracked twice a year.

Among other areas of strategical significance for the case company, strategically important areas: sustainability/environment, safety, and quality, are included in the BU level scorecard – and the case descriptions presented in this section were conducted with the managers of those three areas. The managers used their own scorecards to manage performance of specific things that are often linked to the BU -level objectives and KPIs.

### *Benefits of performance measurement*

All three interviewees listed benefits related to similar topics – if defined broadly, the listed benefits were related to four different topics: 1) ability to argument things (internally and externally), 2) decision-making and reacting to problems, 3) planning instructions and initiatives, and 4) learning and sharing information across functions and units. Ability to argument different things for internal and external parties was listed by all three interviewees. The data was used for internal purposes for example in driving forward development ideas and illustrating points where more resources would be needed. The managers in quality and in sustainability functions saw this as a key benefit and described it as follows:

*“Especially when validating and reasoning things for the top-management, performance indicators and information gathered with the PM system come in handy.” – Quality manager.*

*“...numbers tend to appeal to people quite well and it’s a good way to justify what areas need improving and development.” – Sustainability manager.*

The safety manager saw that the KPIs were also very beneficial in arguing for instructions, guidelines and developments towards the construction sites. He described a practical example of this:

*“If we notice that in some unit they have previously done a lot of management’s safety at work tours, and the next year it seems to go down radically, we are able to go there and argument with real numerical data about the increase in probability of accidents occurring in their construction site because of it.” – Safety manager.*

As managers of their functions, all three interviewees also reported that they reply to external questions and reports about various things and that the KPIs are helpful in argumentation in these situations as well. The manager in sustainability area also used the data and KPIs in her scorecard to build commercial cases around green projects by combining sustainability related data and KPIs with financial data – used for internal justification but also towards external parties such as customers. She described it as follows:

*“We make commercial cases (around green projects) and we get data from our PM system to back them up – we are able to build communications also about the rationality of our operation.” -Sustainability manager.*

The second, commonly seen benefit of performance measurement by the interviewees was its usefulness for decision-making and the ability to react to problems if they appear. The manager in safety saw that in their safety scorecard, they are able to make comparisons between units and finding problems and, to a certain degree, also react to them. As key enablers, he saw the that the KPIs are clear and simple enough, and that they are mostly leading KPIs, enabling the reaction to problems. He described it:

*“The (safety) scorecard includes relevant things and it doesn’t have too many measurements in it, analyzing correlations between different KPIs and accident frequency has helped with planning... ..all KPIs, except for accident rate itself, are leading KPIs that are measuring our efforts in decreasing the accident rate.” – Safety manager.*

Similar to the ability to argument things, the quality manager also saw that the KPIs in his scorecard, enable them to make less decisions based on someone’s feeling of how things are going. Getting fact-based statistics on performance gives a more solid ground for decision-making. Managing performance and reacting to things is also possible because the set of measures in the quality scorecard give room for causal reasoning between the KPIs. The interviewee presented an example of this:

*“I’m able to see interconnections between things from the dashboard. For example, if the construction sites are reporting that there are shortcomings in the quality of supplied windows and doors, the next reaction I see is that customers are calling about the defects they can see, and eventually that will also be indicated in the insurance costs (a KPI in business unit -level scorecard) – this way we are able to see that this might be something to look closer into”. - Quality manager.*

The manager in the sustainability also saw that for decision-making and reaction to problems, the scorecard she used, had its strengths. When describing it, she also brought up the third benefit, which can be seen as a common thing for all interviewees: the scorecards were used not only for reactive fixing of things, but as managers of support functions, they all saw that the ability to plan initiatives, action plans, and instructions for the company's construction site -level was a big benefit. The sustainability manager described it as follows:

*“If we think for example from the point of view of waste – we track it to support our decision-making but also to control (that too much waste is not being generated) based on the KPIs. Another similar one is the amount of green projects, we need to plan what projects we take on, how to carry them out, and track them. And if the amount is too low, then we need to react and make corrective actions.”* -Sustainability manager.

As mentioned before, the manager in safety saw the KPIs as useful tools for the planning, but he saw as a key enabler of this the use of a tool called the ‘safety road map’. The safety road map is prepared by the site managers and they have freedom in recognizing the critical things for their site, planning the actions, and formulating KPIs if the actions are measurable. The manager in safety saw that with their set of common KPIs they are able to support the site levels, but also that the autonomy of site managers has helped them to take into account that all projects have different safety risks and different things that are crucial.

Enabling learning and sharing of information between different functions, units, and construction sites, was the final benefit listed by all interviewees. It needs to be noted that all interviewees also saw that transparency of information in KPIs between different organizational levels and across functions was a challenge. In other words, the learning and sharing was possible and beneficial but there was still work to be done to enable it happen faster and more transparently. Being able to track differences in performance between different sites and units was a key enabler of triggering this sort of learning and sharing of best practices.

### *Challenges with performance measurement*

The most critical challenges that came up with the interviewees were related to 1) communication and transparency, 2) clarity of the PM system and its objectives, and 3) manual work. As mentioned, the interviewees all shared that there is a challenge related to communicating the performance to site level, and also across different functions. The manager in sustainability for

example saw that transparency in the organization related to sustainability issues, their sustainability strategy, and the sustainability related KPIs is lower than she would like them to be. She listed as one main thing behind this, the clarity of the BU level scorecard's KPIs and objectives. Also, the safety manager and the quality manager shared the view that the system as a whole might not be clear, when commenting on the whole business unit level scorecard:

*“This (clarity of objectives) has mostly to do with what we want from the system – these (systems) easily get too complicated because we don't know what we really want. We have a difficulty of crystalizing the objectives, and the amount of KPIs tends to grow too big.”* – Safety manager.

*“We have decreased the amount of the ‘official’ KPIs quite a lot, and it has helped, however for someone who doesn't track these measurements on a daily basis, they would be probably quite confused with what all the measurements should be telling them, especially for site level workers.”* – Quality manager.

A key thing behind the challenge of transparency was also the difficulty to effectively communicate the performance to the right people at the right time. This had a lot to do with the nature of the business where multiple projects are ongoing simultaneously in different locations and in different phases of the construction project. Also, IT systems were seen as inadequate tools for communication. The quality manager for example described the communication challenge as follows:

*“There are so many projects going on all the time, and the site level workers are even harder to reach. There is so much communication going back and forth already by emails and company intra that those venues aren't good ways to reach people anymore.”* – Quality manager.

Also the safety manager saw that communicating performance KPIs to the site level is not effective enough. He saw that the system for performance measurement was inadequate in reporting the figures to the site level. This was seen particularly frustrating since the process of data gathering and all data is already available, but the system is not allowing the site level reporting. He described it as follows:

*“The steering ability and usability of the measurement software could be better. It's not a reporting tool, it's a scorecard. I can go to the construction site and ask ‘tell me your safety situation’ – I get a different response every time (because no standard site level report exists).”* – Safety manager.

A shared challenge arising from low level of transparency and inability to effectively communicate the performance is that the information that is created and tracked is not used effectively by site level managers. This was a concern that bothered all the interviewees:

*“Project managers could also benefit from these (measurements) but they don't because they necessarily don't have the information on what the figures are used for what things are managed with the*



*information. For example, the site managers could convert the waste figures into euros and find ways to reduce that and make their project more profitable.” – Sustainability manager.*

*“Since the site level management is not able to utilize the information immediately in real time or even on a monthly basis (well enough) – the checking and acting parts (of the PDCA cycle) are left for less attention. This limits the ability to check and make corrective actions.” – Safety manager.*

In addition to the reporting tool and the sometimes unclear objectives of the PM system, the IT systems and tools in general were seen as a big contributor to the challenge of reporting the figures fast enough for site level people (who are in the end able to affect performance). The lack of automation and multiple databases that are used are creating a lot of manual work for data gathering, validating and combining. As an example, the sustainability manager raised that the data that she uses for monthly reports is fragmented around the organization in different databases:

*“There’s a lot of different reporting tools in use – this makes it challenging since the tools don’t communicate with each other. First I need to get a list of our green projects, then start going through each project one at a time and collect the environmental data and start classifying them. This is frustrating since it takes half a day of work easily and you only want to give people the information, transparency is not created because of the time it takes. After the quartile it is difficult to affect things although corrective actions are taken.” – Sustainability manager.*

#### 4.2.6. Analysis of case findings

This part presents the analysis of findings made in the multiple case study. The section attempts to highlight common benefits and usage practices that were seen as enabling the attained benefits, as well as present and analyze common challenges in achieving benefits of PM.

As an immediate observation from the case studies, it seemed that when discussing about PM system challenges, the topics were often related to the benefits already discussed. I.e. for most interviewees, the reported challenges were seen as obstacles to further develop the system so that the same benefits could realize even better. When challenges were unrelated to the benefits or expected benefits from the PM system, they were often related to very contextual factors. For example, in Case 2 – the interviewee reported mostly challenges that were related to the specific industry. Therefore, the analysis will be structured and focused around the benefits of performance measurement as topics for the analysis, and common challenges will be discussed under each topic.

First, the analysis will focus on different purposes that the case organizations had set for their PM systems. After this, the common benefits of performance measurement presented in the literature review, provide the theoretical background and structure for analyzing both, attained benefits, and challenges, by focusing on 1) decision-making, 2) communication and transparency, 3) learning, and 4) ability to argue and legitimize decisions (See Appendix 2 for a summary of benefits and challenges).

### *Purposes for performance measurement*

The purposes for performance measurement found in the interviews varied quite a lot between each other when analyzed in context. Among some of the listed purposes were: production planning and operational management, integrating performance information into one place, implementing a quality management system, supplier management, management of strategy and support function management related to safety, quality, and sustainability. In many of the cases, the system was also used for individual performance evaluation and as the basis for incentives.

As an interesting point, many cases showed purposes that were related to implementing strategy. In three out of the five cases, the interviewee had quite a holistic view of the PM system in the organization, and strategy was one focus area in these performance measurement systems. Among these were cases; 1, 3, and 4. In case 2, the measurement was aimed at managing supplier performance, and for internal information and control over supplier selection process. In this case, the interviewee saw little relevance for the scorecard to implement organizational strategy. In case 5; construction company, the interviewees represented managers of three different support functions in their organizations. In this case, the scorecards contained KPIs focusing on topics that were relevant to the function management for decision-making and communication, but also KPIs which had been cascaded down from business unit level strategy.

Therefore, it can be outlined, that in four out of the five cases, the interviewees reported that the PM system had been developed based on strategic objectives which had been cascaded down to lower levels and translated into operational, non-financial KPIs. However, in none of the cases the primary usage purpose was reported as solely to implement strategy, and explicit and clear statements of the primary usage purpose were rare. This might be because all interviewees

represented quite different backgrounds and positions in their organizations, which highlights the relevance of many roles and viewpoints that organizational members may have about their PM systems (Micheli & Manzoni, 2010).

Referring to the plurality of roles and the different roles that the interviewees had in their organization, the systems were also used as forms of diagnostic control with specific objectives for the interviewees. I.e. although that in most cases, the system as a whole had relevance for implementing strategy, when used in practice by the interviewees or their subordinates, the KPIs were used for diagnostic management of operations as well. Overall, for this purpose it can be outlined that the systems were expected to: provide information and base for sound decision-making, show discrepancies in actual performance versus standards, and to enable corrective actions in a timely manner.

### *Decision-making*

In all cases, it was reported that the PM system has helped with decision-making, planning, and control, in one way or another. Although, again, tied in context, overall benefits associated with improved decision-making, can be outlined. Firstly, the PM systems and KPIs were seen to provide sound basis for decision-making. Second, all interviewees reported that the PM system was able to provide information for finding root causes to problems. Third topic was decreased reaction time, which was a benefit that did not realize in all cases, yet it was discussed in most cases as either a challenge or a benefit. As the final point on decision-making, the PM system had benefitted by making it possible to benchmark performance, and to determine target levels.

The KPIs role in providing sound basis for decision making was a topic shared by all the interviewees. For example, in case 1 it was seen that one of the biggest benefits has been better decisions that are based on actual activities and operations, also in case 2 – it was seen as one of the biggest benefits that ‘decisions have become fact-based’. As another example, in case 3, the interviewee described as well that the quality of discussions and the resulting decisions has increased. The theme was common in all cases, and the interviewees felt that they had something concrete to back up decisions and make analysis to base decisions on. It was however difficult to

find clear single usage practices from the cases that could be attributed to enabling the benefit. The benefit of having sounder base for decision-making as a ‘decision-support’ –system, can be seen as quite an overall benefit, which is likely to result in the cases from the act of measuring performance and having access to data that can then be utilized as the basis for decision-making.

As the second topic which was discussed in all cases was the ability find root causes to problems, which was stated as a clear benefit in cases 2, 4 and 5. In all of these three cases, the main factor enabling this was the use of cause-and-effect relationships between KPIs. In cases 2 and 4 one key usage practice behind this was also that the KPIs had been divided into different dimensions. Both interviewees described how the dimensionality helped in reasoning and understanding effects in one dimension to another, and how it also enabled them to ‘drill down’ into specific KPIs that were causing the problems.

In case 5, the discussed scorecards were not split into different dimensions in the same sense, as they were focused on measuring function specific –performance. However, in case 5, cause-and-effect relationships was seen as the integral factor enabling the ability to limit their analysis to key focus areas, and all interviewees from the organization reported that they were able to make causal reasoning based on the KPIs in their scorecards. I.e. whether or not the KPIs were divided into different dimensions, the ability to make causal reasoning between KPIs was seen as a key enabler. These observations give support to the findings in the literature review, that causal linkages between KPIs can benefit their users, regardless of how difficult it might be to create accurate models of all things affecting the organization’s performance (Bourne et al., 2014; Bukh & Malmi, 2005). Further, none of the interviewees reported that causal linkages between measurements would have been a central challenge for decision-making, rather they seemed to emphasize the users’ role in actively thinking about the relationships and questioning them instead of expecting a completely accurate model that would work in every situation.

The third benefit, was decreased reaction time to problems or areas requiring attention, however the topic was not shared as a realized benefit among all interviewees. In case 1, it was reported that the implementation of a new PM system had enabled them to react faster to deviations from standard performance. A distinguished enabler of this was the communicational factor of

transparency, also relatively small organization with a flat structure was enabling fast communication and acting on potential problems in the production. Whereas in case 3, the ability to make timely decisions was discussed and seen as an important benefit, but as a benefit which was not yet completely realized since recent implementation of the system.

Further, in case 4, decreased reaction time was seen both as one of the main benefits and as the main challenges. Enabling factors for decreased reaction time were the ability to find root causes, but also the systematic way in which management stepped in and monitored the performance. I.e. it can be seen that diagnostic control was enforced by prompt reactions from management on deviations from standard performance, which enabled them to decrease the reaction time of lower level management to proactively start fixing problems. This type of usage was also suggested by Malina and Selto (2001), who outlined that managers need to be made aware of assessment criteria and resulting reward or penalty should realize promptly. It was however seen that the reaction time was not yet on a satisfying level, and the interviewee saw that challenges related to data quality, manual work and amount of KPIs were mostly the reasons behind this.

In case 5 it was also observed that ability to react to problems was a key challenge, which was also related to manual work, data quality and validation, but also on IT systems and reporting systems' ability to effectively communicate the information in a timely manner. However, it seemed that in case 5, the measurements were used for performance evaluations in a more interactive way, and performance was discussed together with lower level managers, which seemed to be beneficial when taking into account the problems related to data quality. This finding is in line with Tuomela's (2005) finding that interactive use has less demands for data quality and appropriate target levels since performance can be discussed and analyzed together.

The last point related to decision-making processes, was the ability to benchmark and find appropriate target levels. The ability to benchmark performance and make comparisons between for example business units, was an integral usage practice for enabling the recognition of problem areas. As key enablers of this were standardized KPIs, or similar KPIs across different units and organizational levels. These findings are supported by the observations made in the literature review that the terms used should be clearly defined (Goodman, 1998), and that common measures

are cognitively easier to understand and compare (Lipe & Salterio, 2000). For example, in case 4, it was seen that the unified ‘language’ and standardization enabled the comparisons. In contrast, in case 2, the target levels and comparisons were slightly harder to make since the lack of standardized KPIs, that resulted in the mismatch between the supplier’s own KPIs and the KPIs that the case company was using to evaluate performance. Thereby, highlighting the importance of common terminology and standardization when using KPIs for benchmarking.

### *Communication and transparency*

Communicational factors were also seen as benefits and as challenges among the case organizations. As a relatively common challenge for all interviewees was the lack of focus in the PM system. As outlined already when discussing the usage purposes, many of the interviewees didn’t seem to have explicitly defined main purposes and roles for their systems. This ambiguity caused difficulties for prioritizing and also made interpretation of the KPIs more difficult (this difficulty might also be attributed to challenges in decision-making). However also from this ambiguity it followed that the amount of KPIs had grown large in few cases (case 4 and 5). This caused problems and challenges in the sense that interviewees felt it was difficult to get a clear picture of the specific objectives, and also made it more difficult to ‘get the big picture’. Other key challenges related to efficient communication and creating transparency were the lack of automated software for PM, problems with using reporting systems, and administrative work such as manual updates and data validation taking time from efficient and timely communication.

Those who reported that they had a clear structure and had limited the amount of KPIs, also reported that this had significantly improved the communicational effectiveness and transparency. For example, in case 1, transparency was seen to be on a high level already since KPIs were visually present for every manager on their screen whenever using the company ERP system. Performance was discussed quite frequently, the interviewee described that they have a simple set of KPIs, and the small organization was an easier environment for efficient communication when compared to the other cases in this study. Clarity of goals and effective communication seemed to work well in a in a larger organization’s context as well. In case 2, the scorecard had clear focus,

and the interviewee reported that the communicational factors were in the focus area, but also a lot of effort was put into systematic, quarterly interactions with suppliers to discuss performance and appropriate target levels.

Common terminology on KPIs and other performance areas within organizations was seen also as a critical factor among the interviewees. In cases 3 and 4 this was seen as an enabler of many benefits related to decision making, and also learning and transparency. For example, the interviewee in case 4, described that the standardization and naming the KPIs has enabled different parts of the organization to ‘speak the same language’. In contrast, in cases 2 and 5, this was seen as a challenge and an impediment for making informed comparisons and for transparency in the organization.

### *Learning*

It can be outlined that many of the benefits already analyzed, such as the ability to benchmark performance, and ability to effectively communicate and report performance KPIs, can be seen to have a significant impact on the organization’s ability to learn. Learning was listed as a benefit in all the cases. Among the case organizations, the learning benefits can be seen to be somewhat divided into two groups. Some of the organizations had just implemented or made significant changes to their PM system, whereas some had been using the system already for quite a while. This made a slight difference in the way that learning had occurred in the organizations.

Organizations who had recently implemented their PM system, or made significant changes to it, learning during the process was seen as one of the largest benefits. It was also emphasized that managers on lower levels and individuals across the organization had learned a lot about the key processes and KPIs. This was seen to have happened as the result of the fact that making the change had required conversations, questioning, and agreeing on common terms on what things are to be seen as critical, which is indicating a form of interactive control.

Interviewees who had been using their PM system in its current form for some time already, had processes for diagnostic control but learning required more systematic forms of interactive control. The ability to benchmark performance between units or functions was seen as a key enabler of

learning and conversations. As discussed earlier, the ability to benchmark was seen as a benefit related to decision making, but was also utilized to learn about best practices between business units or other similar organizations. In these cases, it seemed to be a key issue also that when used diagnostically, the comparisons between units were seen as a way to detect deviations from standard performance (i.e. for decision support and performance monitoring), but for learning to occur, systematical forms of interactive control and discussions on differing performance were required.

The work related to constant development of the PM system was reported as a challenge in all cases. However, the constant development wasn't on top of the list of main challenges, and the interviewees saw it often times as a natural challenge that was not likely to end any time soon.

#### *Ability to argument and legitimize decisions*

It was also brought up in many of the cases that ability to argument for decisions and performance both internally and externally was a benefit of performance measurement. Among the cases, the performance data was used, both for internal argumentation and for external parties as well. It can be outlined that this benefit was particular to cases 3, 4 and 5. In case 3, the information was used to communicate performance levels to external parties quite a lot, also in cases 4 and 5, KPIs were helpful when replying on inquiries from officials or other external institutions. In case 5, it was seen that the KPIs were very helpful for the managers particularly when driving forwards internal developments and showing areas that require more focus.

Due to the brief period spent with each interviewee, it was difficult to find examples of cases where the systems would have been used to drive specific agendas, to affect others, or use KPIs as a 'tool for power' (Micheli & Manzoni, 2010), rather the KPIs were seen as means to show explicitly what areas require further attention. The information was also used to monitor own work, decision rationalization was not referred to by the interviewees, but it was rather seen that the decisions and communication was based on actual statistical information and resulted in better decisions. This can therefore be seen as a common benefit across the cases, but no specific usage practices related to this were observed, rather it seemed that the KPIs use for external and internal argumentation was a central usage purpose.



### *Note on IT system challenges*

In addition, it was observed that in all cases, except for case 2, there were significant challenges related to IT systems and databases. Although the problems with IT systems were quite context – specific, and were in part caused due to recent implementation of new systems, it can be outlined that on an overall level, the reported challenges were related to data gathering and reporting, deficiencies in reporting systems, overlaps between different databases, and number of different databases. These, in most cases, resulted in increased workload on administering the systems. The slowness of the systems and their abilities to act as effective communication devices was attributed to these challenges. Further, in many cases where IT systems were causing the challenges, the interviewees reported that they were either planning to, or would like to develop their IT systems by introducing BI tools or other software to support their reporting processes.

## **5. DISCUSSION AND CONCLUSIONS**

This section provides a summary of the study, presents and discusses the main findings and discusses the theoretical and practical implications. The section concludes with a review on the limitations of the study and suggestions for further research.

### **5.1. Research summary**

This study explored the usage practices and sophistication of usage practices of performance measurement systems. The study also analyzed the different purposes for which performance measurement systems are used, and the benefits and challenges that users have. In addition, it was attempted to recognize specific usage practices that might influence benefits and challenges. The context of the research was QPR Software's customer base, reached from the company's CRM database.

The study established a distribution of users of PM systems according to the sophistication of their usage practices between five categories, financial, operation, and strategic 1-3. In addition, it analyzed what the systems are used for, and how satisfied the users are with their performance measurement systems in each category. Further, the study attempted to deepen understanding of purposes, benefits and challenges among the most represented category of users, i.e. the operational category.

The literature review was conducted to gain understanding of different usage practices and usage purposes in order to develop the framework for categorizing usage of performance measurement systems. The use of mostly financial KPIs was attributed as the main usage practice of financial category. Operational measurement was seen to be measurement in which both financial and non-financial measurements are utilized. Strategic performance measurement was categorized by adapting and applying Speckbacher et al.'s (2003) framework in terms of usage practices. In addition, the literature review provided basis for analyzing the usage of the most represented usage category 'operational', by discussing overall benefits and challenges, and usage practices that may have an effect on the realization of the benefits.

The research applied two methods for data collection, a survey sent to QPR Software's CRM database, and a multiple case study with selected survey respondents. The survey was devised to explore the different kinds of usage practices that QPR Software's current and potential customers have with their performance measurement. The multiple case study was devised to gain more understanding of usage purposes, practices, and benefits and challenges among the operational category. Among the cases were an SME manufacturing company, supplier performance management at large international manufacturing company, a university of technology, a public company in travel and transportation, and a business unit of a multinational construction company.

## **5.2. Main findings**

The largest category was therefore the operational category, who combine both financial and non-financial KPIs. Further analysis on usage practices among the operational category, revealed that the biggest threshold for them to proceed to any of the strategic categories, was that they didn't use a specific framework for strategic performance measurement. When the purposes for which the PM systems are used between the categories was studied, it was found that the financial category has a clear focus on reviewing financial performance, and that the strategic categories clearly emphasize using their systems for supporting planning and decision-making and driving organization's strategy. Users in the operational category place most weight on reviewing financial performance, however they didn't prioritize any specific purposes as clearly as the other categories.

All survey respondents in total, rated their satisfaction with their PM system at a rather neutral level on all three attributes tested; information quality, information effectiveness, and overall satisfaction. When separated into usage categories, it was found that the users in financial category are the most satisfied, and users in the operational category are the least satisfied with their PM systems. Strategic categories rated above average satisfaction in all three attributes. Interestingly, they rated highest satisfaction with information effectiveness when compared to the other categories, implying that strategic and more sophisticated usage practices may lead to higher level of satisfaction on an overall level, but particularly so in terms of effectiveness of information.

Among the five organizations interviewed from the operational category, it was found that the PM systems were used for a variety of purposes when assessed in organizational context, and definitions of clear main purposes for the PM systems were rather rare. The systems had roles as decision-support systems, diagnostic control systems, operational performance management systems, with varying degrees for purposes of control. It was also found that although none of the users in this category had separated their strategic performance measurements into a specific framework, most of the systems were also used for implementing and developing strategy, as the KPIs used by each interviewee were often cascaded either completely, or partially, from strategic objectives.

The main benefits among the five cases were quite strongly interlinked with the challenges, since they were often seen as obstacles to further develop the system so that the main benefits could realize even better. This formulated the analysis around topics of PM benefits that the interviewees either felt that were on a satisfying level or as benefits they would have liked to see more of. The main benefits of performance measurement brought up among the organizations were 1) supporting decision-making and control, 2) communication and transparency, and 3) learning. The PM systems supported decision-making and control by a) offering a sounder basis for discussions and decision-making, b) making it possible to find root causes to problems, c) decreasing reaction time, and d) by making it possible to benchmark and determine appropriate targets for performance.

Communication and transparency was also seen to have increased, a particular enabler of this was common terminology and standardization of KPIs. All interviewees experienced that one of the main benefits from their PM system was learning. It was found that the amount and the way in which learning had occurred, differed between recent implementers and those who had been using the system in its current form for some time already. Those who had recently implemented their system, had clearly benefitted from learning more as the result of the implementation process, which had required a considerable amount of interactions about key processes, objectives, and KPIs. Among those who had been using their PM systems for some time, the ability to benchmark and make internal comparisons was seen as a key enabler of learning. Through systematical, or

more informal interactive use of the performance data, organizations analyzed reasons behind differing performance levels and shared best practices.

Common main challenges with performance measurement among the case organizations were for the most parts, related to ambiguity of performance measurement objectives, and data quality. Lack of clear main purposes caused difficulties for prioritizing, and made interpretation of the KPIs more difficult. The ambiguity of objectives had also led to the amount of KPIs growing large in few cases, which caused problems and challenges for understanding the specific objectives in different situations. Many of the case organizations had also faced challenges with timely reaction to problems, which was mostly caused by excess amount of manual work needed for ensuring data quality, combining information and updating the performance levels to different scorecards, which was making the reporting process inefficient and lagging. Much of the challenges were also attributed to challenges related to different IT systems, as data gathering, deficiencies in reporting systems, overlaps between different databases, and amount of different databases, were often seen as key obstacles of further increasing the benefits of performance measurement.

#### 5.2.1. Theoretical implications

This study has contributed to the emerging field in performance measurement research on actual usage of performance measurement systems by adopting an explorative, usage practices -based approach to understanding how usage practices may have an impact on performance measurement outcomes. Further, the study provides evidence on the usage purposes, benefits, and challenges experienced by users who use a combination of financial and non-financial KPIs, in this study named as the ‘operational category’.

In this study, the use of a specific framework for strategic performance measurement in which the most strategic KPIs are separated, was used to differ between operational and strategic usage practices. The study found that this was the most constraining factor for users in the operational category to proceed to any of the strategic categories, and that many operational users utilized more sophisticated usage practices than a combination of financial and non-financial KPIs. Further, in the interviews with selected respondents from the operational category, it was found

that the users indeed used quite sophisticated usage practices and that although the KPIs were not seen as a framework for strategic performance measurement specifically, they still had a role for implementing strategy as well. In these cases, the literature suggests that such usage practices constitute an operational PM system, but when assessed in practice, were used for implementing strategy as well. These empirical findings imply that the literature on the specific usage practices that differentiate between operational and strategic performance measurement systems is rather ambiguous, making the transition from operational performance measurement to strategic performance measurement rather large. Moreover, clearer definitions of SPMSs in light of their usage practices, could have provided better insights on how different usage practices impact performance measurement outcomes in operational PM systems as well. Further, the study also finds evidence to support that strategic and more sophisticated usage practices leads to higher level of PM system effectiveness and support in achieving strategic PM objectives, as suggested in the literature (Speckbacher et al., 2003; Kaplan & Norton, 2008).

The findings on the benefit of learning resulting from performance measurement give support that interactive use of performance measures enables learning. The benefit was found as a particularly central benefit for organizations, who had recently implemented, or made significant changes to their PM systems. This is in line with Tuomela's (2005) findings of learning being one of the main benefits from implementing a new PM system. However, the study also found that organizations who had been using their PM systems for some time, also benefitted from learning by making KPIs comparable between units and external parties and by interactively using the KPIs and discussing reasons behind differing performance levels. The finding therefore suggests that performance measurement can benefit their users also in more long-term usage, as opposed to claims in the literature that it is as much the implementation that yields benefits than the actual usage of the PM system itself (Otley, 1999).

The study also recognized the concern that developments in information technology haven't significantly affected management reporting (Granlund, 2011), as many of the case organizations had challenges with increased workload related to manually ensuring data quality, combining information from different databases and reporting the performance KPIs. The finding is in line

with Tuomela's (2005) finding that implementing performance measurement systems, often increases the workload of functions working with management reporting.

### 5.2.2. Practical implications

The observations made on the distribution between different usage categories, can be seen to provide a rough estimation of the usage practices of PM systems among QPR Software's customer base. The findings indicate that the smallest group utilizes mostly financial KPIs, the 'medium - sized' category uses strategic performance measurement practices, and the largest group among the customer base, uses a combination of financial and non-financial measurements, but do not use strategic performance measurement practices in the sense that they don't separate the most strategic KPIs into a specific framework for strategic performance measurement.

From the differences in usage purposes and satisfaction with PM system found in this study, three implications can be outlined. First, those who mostly use financial KPIs, are unlikely to expect benefits related to the implementation of more advanced performance measurement systems, rather it seems that users in this category know quite well what they want from their performance measures and are satisfied with the outcomes. Second, those whose usage practices are more strategic, emphasize using their PM systems for supporting decision-making and driving strategy, and are benefitting from their PM systems. Particularly, strategic usage practices seem to lead to increased information effectiveness, when compared to the other categories. The third implication is that there is a large number of users in the 'middle-ground', the operational category, who seem to have less focus in prioritization between different usage purposes, and are the least satisfied with their PM systems.

The lower than average satisfaction among the operational category can have multiple possible explanations, such as the fact that the category was found to be clearly the largest, drawing the satisfaction levels more towards the average to begin with. However, the observations on the lower focus of prioritization between usage purposes in the survey results, and the findings about the main challenges experienced among the operational category in the multiple case study, suggest that the clarity of PM purposes and objectives is likely to be one factor affecting the lower

satisfaction. For users of PM systems, this implies that it is worthwhile to clearly define what the systems are used for and what is expected from them. The implication also finds support from the literature, suggesting that a clear definition of the purposes, particularly in relation to strategy, is a key aspect of successful performance measurement (Micheli & Manzoni, 2010).

As practical implications for users of PM systems, the study finds supportive evidence that balancing between diagnostic use and interactive use of performance measurements has relevance for organizations when data quality and reliability varies. The findings suggest, that in situations where causal relationships between KPIs and valued outcomes are not clear-cut, data quality is otherwise lower, or results incomparable, interactive use of the KPIs is likely to be more beneficial. Similarly, it confirms that the use of cause-and-effect relationships is central for many of the benefits of performance measurement to realize, but that building causality between KPIs can be quite a challenge (Tuomela, 2005; Norreklit, 2000). However, it was found that in many cases it was enough that the user was able to make causal reasoning between KPIs, without necessarily building the whole system based on accurate cause and effect analysis. This finding supports the views presented in the literature that thinking of the causal relationships and interpreting the KPIs as indicators of performance rather than as complete representations of all factors affecting performance, can yield the benefits (Bukh & Malmi, 2005; Bourne et al., 2014), and that managers should regularly and systematically think about the implied linkages (Kaplan & Norton, 1996).

Further, it was found that a key beneficial usage practice for effective communication and transparency was the use of standardized or similarly named KPIs. This was seen to enable the organizations to 'speak the same language', and to create challenges for transparency in cases where the KPIs were perceived as too different from each other. The study also confirms that if organizations are to gain benefits in learning, the KPIs should be used interactively, as suggested in the literature as well (Malina & Selto, 2001; Vaivio, 2004). It was found that particularly the interaction required in the implementation of a new PM system, can result in learning being one of the main benefits of performance measurement (Tuomela, 2005), but also that regular, and systematical interactions based on the KPIs, is beneficial for learning to occur in the longer term. The implication is in line with Otley's (1999) findings that appropriate feedback and feedforward loops should be in place for learning to occur.



### **5.3. Limitations and suggestions for further research**

The study has had several limitations which need to be taken into account, and assessed as areas requiring further research. Firstly, while the study's explorative focus increased the understanding of how PM systems are used in light of usage practices among QPR Software's customer base, it also limited the analysis to make more depth analysis of the ways in which PM systems are used in day to day practice. Further research could utilize more longitudinal methods for observing what the systems are used for by different individuals and how they are able to benefit from them, by conducting more in-depth field research within a single setting.

This study recognized the importance of defining main purposes for performance measurement systems usage, and that it is likely to dictate the expectations, and resulting benefits and satisfaction with the systems. However, the analysis was limited to the usage purposes that were applied in this study. More specific purposes for performance measurement could be outlined to increase the understanding of what is expected from PM systems. Moreover, it seems that the different roles that PM systems can have in different situations, become more relevant when usage practices are assessed on the individual user's level. The study also focused on exploring the usage of PM systems in light of specific usage practices, but some of the findings imply that further research could expand the notion of usage by studying more behavioristic characteristics of PM systems usage.

In addition, the study focused on exploring PM systems usage practices by assuming that certain usage practices outlined in the framework reflect more or less sophisticated and strategic usage practices. The resulting framework is thus limited in its categorization of the use of PM systems as sets of criteria outlined from the literature. The framework applied in this study regarded all users who combined financial and non-financial KPIs, but who don't use the system particularly for strategy implementation, as 'operational'. The analysis was thus limited in the sense that other usage practices, such as linking incentives with the KPIs, was left for less attention when examining the satisfaction among the users in that category. Therefore, further research could disregard the aspect of how sophisticated or strategic PM systems' usage is, and study in more depth the outcomes of particular usage practices.

On the other hand, this study also recognized that differentiating between strategic and operational PM systems can be challenging in practice. Further research could shed more light on the differing factors between operational and strategic performance measurement systems in light of usage practices or other measurable attributes of the systems. In addition, the study supported the view that organizations who implement strategic performance measurement systems, also use sets of operational KPIs needed for the daily managing of operations simultaneously, even within the same scorecards. Further research should focus on whether organizations make this distinction between strategic and operational of KPIs, and moreover, how the interface between operational scorecards and strategic scorecards, is managed in organizations, and whether that has implications for the benefits of performance measurement.

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# APPENDICES

## Appendix 1: Performance measurement survey

### STRATEGIC PERFORMANCE MEASUREMENT SURVEY

With this survey, we aim to gather more knowledge about how performance measurement systems are used in organizations and what do the users think of the systems. More specifically the usage part of the survey will focus on design purposes, people performance measurement, measurement diversity/KPIs themselves as well as measurement scope. At the end of the survey we would like to hear your opinions about how well your performance measurement system meets your requirements.

The information gathered with this survey will be used by QPR to better understand the practical usage of performance measurement systems and requirements that organizations have in 2016. The survey results will also serve an academic purpose in the form of a master's thesis work conducted at Aalto University School of Business in Helsinki, Finland.

If preferred, the survey can be answered completely anonymously.

In case you have any questions regarding survey and master's thesis, please contact Joni Saarikivi ([joni.saarikivi@aalto.fi](mailto:joni.saarikivi@aalto.fi))

#### 1. BACKGROUND INFORMATION

1.1. Your country \* \_\_\_\_\_

1.2. What function do you represent in the organization? \*

- Finance
- Sales
- Marketing
- Management
- IT
- HR
- Other \_\_\_\_\_.

1.3. What's your role in the organization?

\_\_\_\_\_.

1.4. Does your organization operate in private or public sector? \*

- Public sector
- Private sector

1.5. Sector/Industry\*

- Banking/Finance/Insurance
- Constructions
- Education
- Energy and utilities

- Government
- Healthcare
- IT
- Manufacturing
- Retail & Distribution
- Telecommunication
- Travel & Transportation
- Other \_\_\_\_\_.

## ORGANIZATION SIZE

### 1.6. How many employees are in your organization? \*

- Less than 50 employees
- 50 – 99 employees
- 100 – 249 employees
- 250 – 499 employees
- 500 – 1999 employees
- 2000 – 4999 employees
- Over 5000 employees

### 1.7. How much was your organization's revenue in 2015? \*

- Below 50 MUSD
- 50 – 99 MUSD
- 100 – 199 MUSD
- 200 – 299 MUSD
- 300 – 499 MUSD
- 500 – 999 MUSD
- Over 1000 MUSD

## 2. PERFORMANCE MEASUREMENT METHODS AND OBJECTIVES

This section deals with purposes for which performance measurement is conducted as well as general usage practices and design of the systems.

### 2.1. For which of the following purposes is your organization's performance measurement system used for? Please rate the importance of each purpose in your performance measurement system from 1-5. (1 = not at all important, 5 = extremely important) \*

- Reviewing financial performance
- Supporting planning and decision-making (e.g. for determining action plans)
- Controlling our organization's processes (e.g. measure specific results against standards)
- Reducing waste (e.g. manage operations, capital and technology)
- Driving our organization's strategy (e.g. communicate management directives)
- Managing customer and/or supplier relationships

### 2.2. Does your organization use any of the following business development techniques?

- Performance Prism



- Balanced Scorecard (BSC)
- Total measurement development method (TMDM)
- PDCA (Plan, Do, Check, Act)
- Capability Maturity Model Integration (CMMI)
- Total productive maintenance (TPM) process
- Six Sigma
- Other – please specify \_\_\_\_\_.

**2.3. Does your organization use professional software for performance measurement system automatization?**

- Yes, we use \_\_\_\_\_.
- No

**2.4. Have you made any significant changes to your performance measurement system in the past 2 years?**  
\*

Significant change refers to a structural modification to the system design or administration (in contrast to smaller updates to KPIs).

Yes / No

***(If has made changes)*** Please describe in few words, what was the motivation for making changes to your performance management system?

\_\_\_\_\_.

**2.5. Who in your organization has ownership of your performance measurement system? \***

Ownership of the system refers to the organizational function or party that has responsibility for the system's performance and maintenance, and has authority and ability to make changes to the system.

- Office of strategy management
- Operations / operational excellence
- Business process improvement
- Quality management
- Finance
- Human resources
- IT
- Line Managers
- Other, please specify \_\_\_\_\_.
- We have not assigned ownership of the system to any department
- Don't know

**2.6. Which one of the following descriptions of performance measurement approaches best describes the performance measurement conducted in your organization? \***

- We monitor our operations through KPIs that give us information about our operations, finance, and overall performance, this enables us to stay on track of what is going on in the organization, and provides data to support managerial decision-making.
- In addition to operational KPIs, we have also separated a set of strategic measures (e.g. strategic performance scorecard), which have been developed in order to reach our strategic objectives. This is the most strategic performance measurement system in our organization, and it is used to steer, measure and communicate strategy.

**USE OF CAUSE-AND-EFFECT ANALYSIS IN PERFORMANCE MEASUREMENT**

When answering the following questions, please consider your most strategic performance measurement system applied on the strategic business unit (SBU) level (e.g. a performance measurement scorecard containing the most strategic performance measures).

**2.7. Have you set target values for the measures/KPIs which have been derived from your strategic objectives? \***

Yes / No

**2.8. Have you made action plans to reach your strategic objectives and developed measures/KPIs that measure your organization's performance in those action plans? \***

Yes / No

**2.9. Have you set target values also for the measures/KPIs that measure your organization's performance with the action plans? \***

Yes / No

**2.10. Have you chosen/developed measures for your performance measurement system based on cause-and-effect analysis (i.e. the measures are causally linked with actions taken in order to reach a given objective)? \***

Yes / No

**2.11. Please, estimate, how many of the measures in your performance measurement system have been formed based on the abovementioned cause-and-effect analysis? \***

Yes / No

**3. STRATEGIC PERFORMANCE MEASUREMENT PRACTICES**

This section deals with different practices that are used in performance measurement and management, focusing on people performance measurement, measurement diversity, and measurement scope.

When answering the following questions, please consider your most strategic performance measurement system applied on the strategic business unit (SBU) level (e.g. a performance measurement scorecard containing the most strategic performance measures).

### 3.1. PEOPLE PERFORMANCE MEASUREMENT

#### 3.1.1. On which of the following organizational levels does your organization's performance measurement system track performance on? \*

You can choose multiple levels

- Top management
- Middle management
- Team leaders / Operational management
- Individual employees
- Don't know

#### 3.1.2. Which of the following purposes in competence and talent management do you use your performance measurement system for?

Choose as many usage purposes as you find relevant

- To support the preparation of individual performance appraisals
- To allocate human resources in our organization
- As the basis for individual employees' career planning
- We use data from our SPMS for competence and talent management in some other way. Please specify \_\_\_\_\_.

#### 3.1.3. Does your organization have an incentive plan? \*

Yes / No

#### ***(If has an incentive plan)*** Have you linked the incentives with measures/KPIs, which are also included in your performance measurement system?

Please consider your most strategic performance measurement system applied on the strategic business unit (SBU) level (e.g. a performance measurement scorecard containing the most strategic performance measures).

- Yes, all incentives given are linked to measures that we also track in our performance measurement system
- Yes, some, but not all incentives given are linked to measures that we track in our performance measurement system
- No, we have not linked incentives with measures that we track in our performance measurement system
- Don't know

#### 3.1.4. What level of employees in your organization are given incentives and rewarded based on the measures that are linked to your strategic performance measurement system?

You can choose multiple levels

- Top management
- Middle management
- Team leaders / Operational management
- Individual employees
- Don't know

### 3.2. MEASURES / KPIs

When answering the following questions, please consider your most strategic performance measurement system applied on the strategic business unit (SBU) level (e.g. a performance measurement scorecard containing the most strategic performance measures).

#### **3.2.1. How many measures/KPIs have you included in your organization's performance measurement system? \***

- Less than 10 measures
- 10 – 19 measures
- 20 – 29 measures
- 30 – 39 measures
- 40 – 49 measures
- Over 50 measures

#### **3.2.2. Please estimate what portion of the measures are non-financial/non-monetary measures? \***

- Over 80 % of all measures are non-financial measures
- 60-79 % of all measures are non-financial measures
- 40-59 % of all measures are non-financial measures
- 20-39 % of all measures are non-financial measures
- Less than 20 % of all measures are non-financial measures

#### **3.2.3. Does your organization have a separate corporate level measurement set or a 'corporate scorecard'? \***

Yes / No

#### **3.2.4. How many measures are included in the corporate level scorecard?**

- Less than 10 measures
- 10 – 19 measures
- 20 – 29 measures
- 30 – 39 measures
- 40 – 49 measures
- Over 50 measures

#### **3.2.5. Please estimate what portion of the measures in the corporate level scorecard are non-financial/non-monetary measures?**

- Over 80 % of all measures are non-financial measures
- 60-79 % of all measures are non-financial measures
- 40-59 % of all measures are non-financial measures
- 20-39 % of all measures are non-financial measures
- Less than 20 % of all measures are non-financial measures

### 3.3. SCOPE OF PERFORMANCE MEASUREMENT

Please consider your most strategic performance measurement system applied on the strategic business unit (SBU) level (e.g. a performance measurement scorecard containing the most strategic performance measures).

#### 3.3.1. Which of the following performance categories have you included in your performance measurement system? \*

- Customer relations
- Financial results
- Product and service quality
- Employee relations and learning
- Alliances with other organizations
- Operational performance
- Supplier relations
- Environmental performance
- Community (e.g. public image, community involvement)
- Product and service innovation
- Other? Please specify \_\_\_\_\_.

#### 3.3.2. Next, please tick the most important performance categories for your organization's strategy (max. 4) \*

- Customer relations
- Financial results
- Product and service quality
- Employee relations and learning
- Alliances with other organizations
- Operational performance
- Supplier relations
- Environmental performance
- Community (e.g. public image, community involvement)
- Product and service innovation
- Other? Please specify \_\_\_\_\_.

### 4. USER EXPECTATIONS AND EXPERIENCES

This section deals with satisfaction with the current performance measurement system used, benefits achieved and expectations from the system.

Please consider your most strategic performance measurement system applied on the strategic business unit (SBU) level (e.g. a performance measurement scorecard containing the most strategic performance measures).

#### 4.1. How well has your current performance measurement system supported you in achieving the following performance objectives? Please rate the support for achieving each of the following objectives from 1-5. \* (1 = has not supported at all, 5 = has supported significantly)

- Developing strategy (further)
- Clarifying and communicating strategy
- Improving alignment of strategic objectives with actions

- Strengthening the consideration of non-financial drivers of performance
- Improving financial performance
- Improving strategic learning (control and feedback)
- Building up a base for an incentive system
- Increasing the consideration of stakeholders
- Identifying business process re-engineering opportunities
- Enhancing the investments in intangibles

**4.2. How would you assess the overall quality of the information obtained from your performance measurement system? \***

Likert scale 1 – 7. (1 = very poor quality, 7 = excellent quality)

**4.3. How would you assess the effectiveness of the information obtained from your performance measurement system (i.e. are actions taken in response to information obtained)? \***

Likert scale 1 – 7. (1 = not at all effective, 7 = very effective)

**4.4. How would you rate your overall satisfaction with your current performance measurement system? \***

Likert scale 1 – 7. (1 = not at all satisfied, 7 = completely satisfied)

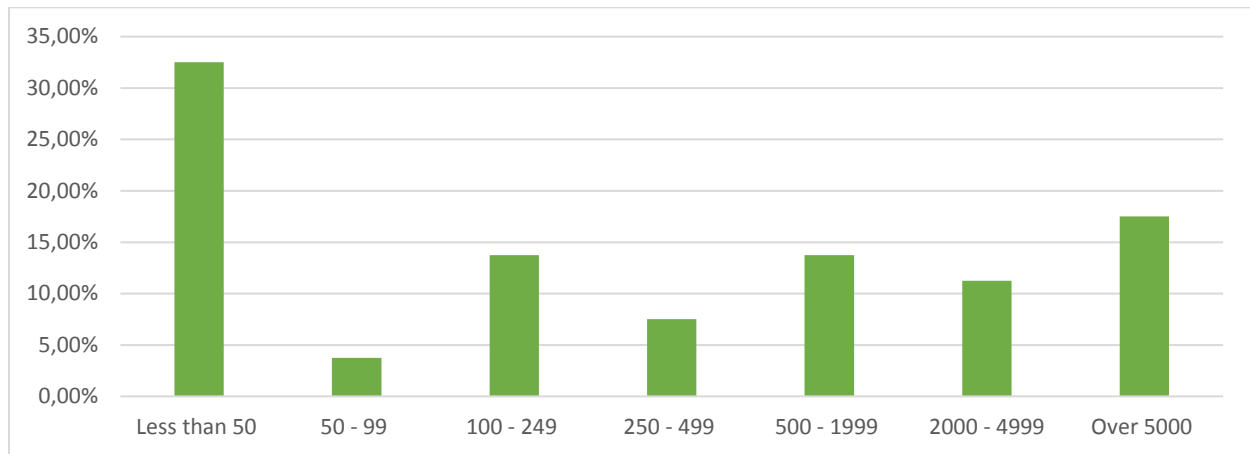
## Appendix 2: Benefits and challenges found in the multiple case study

	BENEFITS	HOW?
CASE 1: MANUFACTURE OF LOGISTICS MACHINERY	<ul style="list-style-type: none"> <li>- Decisions based on actual activities and operations.</li> <li>- Shortened reaction time.</li> <li>- Recognizing opportunities for competitive advantage (reviewing strategy).</li> <li>- Increased managers' focus on performance management.</li> </ul>	<ul style="list-style-type: none"> <li>- From overall financial measurement to measurement of actual activities.</li> <li>- Simple set of KPIs.</li> <li>- Transparency and visibility of performance KPIs with ERP - based PM system.</li> </ul>
CASE 2: MANAGING GLOBAL TRANSPORTATION – SUPPLIER SCORECARD	<ul style="list-style-type: none"> <li>- Fact based discussions and decision-making.</li> <li>- Ability to take into account corrective actions.</li> <li>- Communicate and document KPIs and requirements to suppliers.</li> <li>- Feedback from suppliers.</li> <li>- Better contract terms with suppliers.</li> </ul>	<ul style="list-style-type: none"> <li>- Efficient and structured scorecard, clear objective to measure supplier performance.</li> <li>- Scoring of KPIs and discussions on performance with suppliers.</li> <li>- Increased contract compliance: <ul style="list-style-type: none"> <li>o Transparency in sharing the performance data.</li> <li>o Internal control over supplier selection criteria.</li> </ul> </li> </ul>
CASE 3: MANAGING A UNIVERSITY OF TECHNOLOGY	<ul style="list-style-type: none"> <li>- Understanding of the organization's processes on all levels.</li> <li>- Clearer measurement system and KPIs.</li> <li>- Better decisions and discussions on performance.</li> <li>- Ability to argument decisions and performance internally and externally.</li> <li>- Ability to benchmark performance.</li> </ul>	<ul style="list-style-type: none"> <li>- Learning process when recently implementing PM system as part of QMS.</li> <li>- Determination of key processes.</li> <li>- Decreased number of KPIs.</li> <li>- All strategy and performance data are in one IT system.</li> </ul>
CASE 4: PUBLIC COMPANY IN TRAVEL AND TRANSPORTATION	<ul style="list-style-type: none"> <li>- Supporting decision-making and finding root causes for problems.</li> <li>- Decreased reaction time to deviations from standard performance.</li> <li>- Quality of management improved in the organization.</li> <li>- Enabled learning and sharing information through increased transparency.</li> </ul>	<ul style="list-style-type: none"> <li>- Cause-and-effect relationships between KPIs and dimensions of measurement (BSC).</li> <li>- Standardized KPIs and definitions.</li> <li>- Systematic approach from management to step in when deviations are noticed.</li> <li>- Learning how the system works and how KPIs and measurement dimensions are linked.</li> </ul>
CASE 5: THREE VIEWS ON PM IN A MULTINATIONAL CONSTRUCTION COMPANY	<ul style="list-style-type: none"> <li>- Support in decision-making and reacting to problems.</li> <li>- Ability to argument for decisions and developments (internally and externally).</li> <li>- Planning instructions and initiatives.</li> <li>- Learning and sharing information across functions and units.</li> </ul>	<ul style="list-style-type: none"> <li>- Comparisons between units.</li> <li>- Causal reasoning between KPIs.</li> <li>- Fact based data as means to validate and reason decisions.</li> <li>- Autonomy for site management to determine key areas (in safety).</li> <li>- Scorecard gives feedback on successfulness of work.</li> </ul>

	CHALLENGES	WHY?
CASE 1: MANUFACTURE OF LOGISTICS MACHINERY	<ul style="list-style-type: none"> <li>- Expanding the level of shop-floor measurement without increasing shop-floor workload.</li> <li>- Developing new KPIs.</li> <li>- Ability to do drill-downs.</li> <li>- Ensuring that data is correct.</li> <li>- Target setting.</li> </ul>	<ul style="list-style-type: none"> <li>- Getting data without adding work to shop-floor workers.</li> <li>- Combining data from different sources: <ul style="list-style-type: none"> <li>o IT system</li> <li>o Not optimal because weakens understandability of the KPI.</li> </ul> </li> <li>- Ensuring data correctness.</li> <li>- Historical data on new KPIs challenge.</li> </ul>
CASE 2: MANAGING GLOBAL TRANSPORTATION – SUPPLIER SCORECARD	<ul style="list-style-type: none"> <li>- Data quality.</li> <li>- Finding ways of measuring people and feeling aspects.</li> <li>- Constant development of KPIs.</li> </ul>	<ul style="list-style-type: none"> <li>- Complexity in supply chain.</li> <li>- Lack of international standards.</li> <li>- Contradictions between suppliers' own PM and measurement criteria set by case company.</li> <li>- Target setting that captures also the feeling of performance.</li> </ul>
CASE 3: MANAGING A UNIVERSITY OF TECHNOLOGY	<ul style="list-style-type: none"> <li>- Further development of recently implemented PM system.</li> <li>- Forming a clear picture of processes and their contribution.</li> </ul>	<ul style="list-style-type: none"> <li>- PM system still in development phase.</li> <li>- Aim of constant development of the system.</li> <li>- Overlapping duties/responsibilities and databases.</li> </ul>
CASE 4: PUBLIC COMPANY IN TRAVEL AND TRANSPORTATION	<ul style="list-style-type: none"> <li>- Ability to react to problems fast enough.</li> <li>- Communication and transparency.</li> </ul>	<ul style="list-style-type: none"> <li>- Amount of KPIs and lack of focus on certain key areas at a time.</li> <li>- Lack of automation or BI tools (no automated PM software).</li> <li>- Manual work related to data validation, combination and reporting.</li> </ul>
CASE 5: THREE VIEWS ON PM IN A MULTINATIONAL CONSTRUCTION COMPANY	<ul style="list-style-type: none"> <li>- Communication of KPIs and reporting – transparency.</li> <li>- Clarity of PM systems objectives on BU level scorecard.</li> <li>- Reaction time to problems not on a satisfying level.</li> <li>- Low level of utilization of performance KPIs on site level.</li> </ul>	<ul style="list-style-type: none"> <li>- Amount of KPIs and objectives set in BU level scorecard.</li> <li>- Inadequate IT tools for efficient communication and reporting to site level management.</li> <li>- Data used for performance KPIs scattered into many databases.</li> <li>- Manual work related to data validation, combination and reporting.</li> </ul>



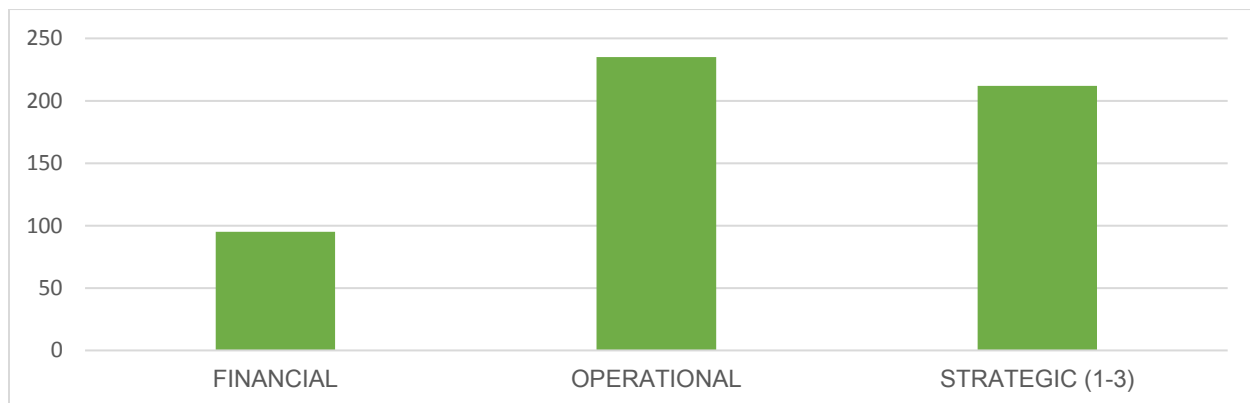
### Appendix 3: Distribution of respondents between different sizes



*Respondents' organization size in number of employees*

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### Appendix 4: Usage category distribution and organization size



*Usage categories and average number of employees (2015).*